



STO TECHNICAL REPORT

TR-HFM-195

## Integrative Medicine Interventions for Military Personnel

(Interventions médicales intégrantes  
à destination du personnel militaire)

This Report documents the findings of Task Group 195, which investigated the current status of Complementary and Alternative Medicine (CAM) in NATO Nations focusing on the utilization and acceptability for Military personnel. Various modalities are described in detail as possible treatments for conditions such as pain, stress and for improved quality of life and resiliency.



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The total spectrum of this collaborative effort is addressed by six Technical Panels who manage a wide range of scientific research activities, a Group specialising in modelling and simulation, plus a Committee dedicated to supporting the information management needs of the organization.

- AVT Applied Vehicle Technology Panel
- HFM Human Factors and Medicine Panel
- IST Information Systems Technology Panel
- NMSG NATO Modelling and Simulation Group
- SAS System Analysis and Studies Panel
- SCI Systems Concepts and Integration Panel
- SET Sensors and Electronics Technology Panel

These Panels and Group are the power-house of the collaborative model and are made up of national representatives as well as recognised world-class scientists, engineers and information specialists. In addition to providing critical technical oversight, they also provide a communication link to military users and other NATO bodies.

The scientific and technological work is carried out by Technical Teams, created under one or more of these eight bodies, for specific research activities which have a defined duration. These research activities can take a variety of forms, including Task Groups, Workshops, Symposia, Specialists' Meetings, Lecture Series and Technical Courses.

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## List of Acronyms

15h30	3:30 pm
18h00	6:00 pm
4h	Four hours
AAAS	American Association for the Advancement of Science
ABIHM	American Board of Integrative Holistic Medicine
ACC	Anterior Cingulate Cortex
ACT	Acceptance and Commitment Therapy
ACT-CIM	Active self-care Complementary and Integrative Medicine
AD	Active Duty
AD	<i>Anno Domini</i>
ADP	Adenosine Diphosphate
AFAC	Air Force Acupuncture and Alternative Medicine Center (United States)
ALT	Alanine aminotransferase
AM	Anthroposophic Medicine
AMBQ	Animal-Mascot Bond Questionnaire
AMSUS	Association of Military Surgeons of the United States
ANOVA	Analysis Of Variance
ASP	Acupuncture Semi-Permanent
ASP	Aiguille Semi-Permanent
ATACS	Acupuncture Training Across Clinical Settings
ATP	Adenotriphosphate
AUS	Australia
BAT	Branched-chain Amino acid Transaminase
BC	Before Christ
BCE	Before Common Era
BFA	Battlefield Acupuncture
BHI	Benson-Henry Institute
BUL	Bulgaria
BUN	Blood-Urea-Nitrogen
CA	California (United States)
CAM	Complementary and Alternative Medicine
CBF	Cardiobiofeedback
CC	Cardiac Coherence
CCP	Citullinated Protein Antibiotics
CD	Compact Disc
CE	Common Era
CHOL	Cholesterol
CI	Confidence Interval
CIM	Center for Integrative Medicine
CIM	Complementary and Integrative Medicine
CISS	Coping Inventory Stressful Scale
CMS	Centers for Medicare and Medicaid Services
CNS	Central Nervous System
COL	Colonel (U.S. Military)
COMEDS	Committee of the Chiefs of Military Medical Services
COO	Chief Operating Officer
CPMCP	Comprehensive Pain Management Campaign Plan

CPT	Captain
CSF	Comprehensive Soldier Fitness
CSI	Combat Survival resistance to Interrogation (training)
CSL	Center for Spiritual Leadership (United States)
CTP	Cytidine Triphosphate
CY	Calendar Year
CZE	Czech Republic
d	Effect size (Cohen's d statistical test)
DA	Department of the Army
DBT	Dialectical Behavior Therapy
DC	District of Columbia (United States)
DCCS	Deputy Chief of Clinical Services
DCoE	The Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury
DEU	Germany
DHA	Defense Health Agency
DICP	Dalian Institute of Chemical Physics
DIKW	Data, Information, Knowledge and Wisdom
DLPFC	Dorsolateral Prefrontal Cortex
DM	Diabetes Mellitus
DNA	Deoxyribonucleic Acid
DO	Doctor of Osteopathic Medicine
DoD	Department of Defense (United States)
DoD/VA	Department of Defense / Veterans Affairs (United States)
DOTLMPF	Doctrine, Organization, Training, Leader, Development, Material, Personnel, Facilities
DP	Depressive relapse Prevention
DPhil	Doctor of Philosophy (Oxford term for PhD)
DVD	Digital Versatile Disc, Digital Video Disc
EBP	Evidence-Based Practice
EC	European Commission
ECG	Electroencephalographic
Ed.D	Doctor of Education
EEA	European Economic Area
EEG	Electroencephalography
EFCAM	European Federation for Complementary and Alternative Medicine
EFT	Emotional Freedom Technique
EICCAM	European Information Center on Complementary and Alternative Medicine
EKG	Electrocardiographic
EPA	Eicosapentaenoic Acid
EPMA	European Association for Predictive, Preventive, and Personalized Medicine
ER	Emergency Room
ERG	Existence (safety), Relatedness and Growth
EST	Estonia
EU	European Union
EXCEL	Army's Excellence in Character, Ethics and Leadership
F	F-value, statistical term, ratio of 2 different measure of variance for the data
FAAIM	Fellow of the American Association of Integrative Medicine
FAAPMR	Fellow of the American Association of Physical Medicine and Rehabilitation
FAST	Feasible, Acceptable, Sustainable and Timely
FDA	Federal Drug Administration (United States)
FF	Fire Fighter
FHPR	Force Health Protection and Readiness

FMI	Friburg Mindfulness Inventory
fMRI	functional Magnetic Resonance Imaging
FRA	France
FS	Flight Surgeon
FY	Fiscal Year
GAO	Government Accounting Office
GBR	Great Britain
GER	German
GMP	Group Manufacturing Practice
GNP	Gross National Product
GP	General Practitioner
Gr	Group
GRC	Greece
GRP	Generation Research Program
HAIG	Healthcare Analysis and Information Group
HC	Heart Coherence
HFM	Human Factors and Medicine (Panel)
HQ	Headquarters
HPRC	Human Performance Resource Center
HRV	Heart Rate Variability
HTN	Hypertension
HUN	Hungary
ICPH	Inner Congruence and Peaceful Harmony
IED	Improvised Explosive Device
IGA (IgA)	Immunoglobulin A
IGG (IgG)	Immunoglobulin G
IgM	Immunoglobulin M
IH2	Integrative Health and Healing
ILV	Isoleucine-Valine
IM	Integrative Medicine
IPMC	Interdisciplinary Pain Management Center
ISAF	International Security Assistance Force
ITA	Italy
JD	Doctor of Jurisprudence
JHWH	Jehwah (Hebrew for God)
JIA	Juvenile Idiopathic Arthritis
JIF	Joint Incentive Fund (United States)
JPN	Japan
K	Kapha (water)
KOR	Republic of Korea
LAc	Licensed Acupuncturist
LBP	Low-Back Pain
LEU	Leucine biosynthesis
LI 4	Large Intestine 4
LLC	Limited Liability Company
LMU	University of Munich (Germany)
LY#	Lymphocyte number

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M0	Month 0
M4	Month 4
M6	Month 6
M12	Month 12
M18	Month 18
MA	Massachusetts (United States)
MA	Master of Arts
MAPS	Microacupuncture Point Systems
MBCT	Mindfulness-Based Cognitive Therapy
MBSR	Mindfulness-Based Stress Reduction
MC	Medical Corps
MC	Médecin en chef
MCHC	Mean Corpuscular Hemoglobin Concentration
MD	Maryland
MD	Medical Doctor
MeSH	Medical Subject Heading
MHS	Marine Hospital Service (United States)
MHS	Military Health System
MIT	Massachusetts Institute of Technology
MMFT	Mindfulness-based Mind Fitness Training
MPH	Masters of Public Health
MRI	Magnetic Resonance Imaging
MRMC	Medical Research and Materiel Command
mRNA	messenger RNA
MS	Master of Science
mTBI	mild Traumatic Brain Injury
MTF	Medical Treatment Facilities
MWR	Morale, Welfare and Recreation
N	Sample Size
NATO	North Atlantic Treaty Organization
NCCAM	National Center for Complementary and Alternative Medicine
NCCIH	National Center for Complementary and Integrative Health
NICoE	National Intrepid Center of Excellence
NIH	National Institute of Health
NJ	New Jersey (United States)
NLD	Netherlands
NNMC	National Naval Medical Center
NNT	Number Needed to Treat
NOR	Norway
NP	Nurse Practitioner
NRS	Numerical Rating Scale
NSAID	Non-Steroidal Anti-Inflammatory Drug
NZL	New Zealand
OA	Osteoarthritis
OAM	Office of Alternative Medicine
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
OTC	Over-The-Counter
OTSG	Office of The Surgeon General
P	Pitta (fire)
PA	Pennsylvania (United States)

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PA	Physician Assistant
PC1	Principal Component 1
PCA	Principal Component Analysis
PCL-M	Post-traumatic stress disorder Checklist – Military version
PCL-S	PTSD Check List Scale
PEK	Programm Evaluation Komplementärmedizin (GER)
PENS	Percutaneous Electrical Nerve Stimulation
PFF	Paris Firefighters
PhD	Doctor of Philosophy
PHS	Public Health Service (United States)
PITT	Psychodynamisch Imaginative Traumatherapie (GER)
PLS-DA	Partial Least Squares Discriminant Analysis
PLT	Platelet count
POC	Point Of Contact
POL	Poland
POMS	Profile Of Mood States
POR	Portugal
PSS	Perceived Stress Scale
PTSD	Post-Traumatic Stress Disorder
QoL	Quality of Life
R-S-	neither Religious, nor Spiritual
R6	Rehmannia 6
RA	Rheumatoid Arthritis
RCT	Random Controlled Trial
RDW	Red blood cell Distribution Width
REM	Rapid Eye Movement
RN	Registered Nurse
RNA	Ribonucleic Acid
ROS	Reactive Oxygen Species
ROU	Romania
RP	Relapse Prevention
RR	Relaxation Response
rRNA	ribosomal RNA
RTA	Research Technology Agency (now CSO – Collaboration Support Office)
RTG	Research Task Group
RTO	Research and Technology Organisation
SAS	Special Air Service
SC	South Carolina (United States)
SD PPM	Sino-Dutch Centre for Preventive and Personalized Medicine
SD	Standard Deviation
SLE	Systemic Lupus Erythematosus
SM	Service Member
SME	Subject-Matter Expert
SMP	Stress Management Programs
SpNQ	Spiritual Needs Questionnaire
SpR	Spirituality/Religiosity
SpREUK	SpR in chronic illness
SPSS	Statistical Package for the Social Sciences
STANAG	Standardisation Agreement
STO	Science and Technology Organization

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TAG	Technical Advisory Group
TATRC	Telemedicine and Advanced Technology Research Center
TBD	To Be Determined
TBI	Traumatic Brain Injury
TCM	Traditional Chinese Medicine
TENS	Transcutaneous Electrical Nerve Stimulation
TF	Task Force
TFF	Total Force Fitness
tHMP	traditional Herbal Medicinal Products
TM	Transcendental Meditation
TNO	The Netherlands Organization for Applied Scientific Research
TOP	Tactics to Optimize the Potential / Techniques d'Optimisation du Potentiel
TR	Technical Report
TRE	Trauma/Tension Release Exercises
TRM	Trauma Resiliency Model
tRNA	transfer RNA
TUR	Turkey
TX	Texas (United States)
UDP	Uridine Diphosphate
UMP	Uridine Monophosphate
U.S./USA	United States
USAF	United States Air Force
USIS	United States Information Service
UTP	Uridine Triphosphate
V	Vata (wind)
v	Version
VA	Veterans Affairs
VA	Virginia (United States)
VAS	Visual Analog Scale
VHA	Veterans Health Administration
VT	Vietnam Theatre Veterans
WG	Working Group
WHO	World Health Organization
wrTSR	war-related, Trauma Spectrum Response
WWI	World War One (I)
WWII	World War Two (II)
YNSA	Yamamoto Neue Schadelakupunktur

# Glossary

**Active participation modality** is a treatment modality in which the individual actually engages in the treatment. It is related to the patient's active involvement in their own care by participating in both the care plan and treatment. Examples of active participation modalities include yoga, meditation, acupressure and exercise.

**Acupressure** is the application of pressure in sites used for acupuncture with therapeutic intent.

**Acupuncture** is an ancient Chinese healing technique with roots in Traditional Chinese Medicine (TCM) in which the stimulation of specific points along meridian channels in the body is achieved by piercing the skin with needles in order to enhance the flow of energy, cure diseases, relieve pain and stress and regulate the body.

**Acupuncture Training Across Clinical Settings (ATACS)** refers to the teaching of the Battlefield Acupuncture in Medical Facilities of the Department of Defense and the Veterans Administration. The program has trained physicians, nurses, Special Forces and other ancillary healthcare clinicians.

**Acute pain** is “normal pain” that occurs as a result of injury or disease. It typically lasts no more than 3 – 6 months, is self-limiting and responsive to appropriate therapies. Acute pain ends when the inciting harm is ended and the healing response to the harm is complete.

**Aiguille Semi-Permanent (ASP)** refers to a semi-permanent needle used in acupuncture that are sterilized and pre-packaged in a plastic injector. The 2 mm-long needles may be gold, titanium or stainless steel. The acupuncture technique of Battlefield Acupuncture (BFA) uses the ASP needles. The needles typically fall off in approximately 3 – 4 days.

**Algorithm** is a procedure or formula for solving a problem. It is a self-contained step-by-step set of operations (decisions) to be performed. Algorithm is derived from the name of the Persian mathematician, Mohammed ibn-Musa al Khwarizmi (780 – 850 AD). An algorithm is typically structurally inflexible but can have random inputs. Algorithms are often associated with mathematical processes but recently are being used in medical practices to determine treatment plans.

**Allopathic** is the medical practice related to conventional or orthodox medical practice.

**Allostasis** is the process of achieving stability, or homeostasis, through physiological or behavioral change.

**Allostatic load** is “the wear and tear on the body” which grows over time when the individual is exposed to repeated or chronic stress. It represents the physiological consequences of chronic exposure to fluctuating or heightened neural or neuroendocrine response that results from repeated or chronic stress. McEwen and Stellar coined the term in 1993.

**Anthroposophic medicine** (Anthropos = human being; Sophia = wisdom) is a form of complementary medicine developed by Rudolf Steiner that views the entire human being. The anthroposophical approach to medicine adds spiritual insight to diagnosis and healing. Applied by conventionally trained medical doctors who combine orthodox medical treatment with complementary practice, this modern holistic paradigm combines European homeopathics, plant medicines, natural remedies and elements of allopathic principles. Inspired by Rudolf Steiner (1861 – 1925), anthroposophic medicine takes into account that human beings, nature and the cosmos are interrelated. Many other therapeutic disciplines that have developed within the approach include: homeopathic and herbal remedies; homecare; nursing; artistic therapy; music therapy; hydrotherapy; curative eurythmy (movement); and massage.

**Antihomotoxicology (complex homeopathy)** – Classical homeopathy works with single remedies which are only partly truly single-constituent remedies, (e.g., sulphur, mercury, arsenic), or which are otherwise botanical extractions containing a highly complex mixture of numerous constituents. Repertories (lists of symptoms produced by drugs) facilitate the selection of the most appropriate remedy in homeopathy. Anti-homotoxic medicine usually pursues an

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indication-oriented approach. The anti-homotoxic remedies predominantly represent mixtures of substances of low to middle potencies. Through practical application in homeopathy it became obvious that the use of concentrated or poisonous tinctures could damage the patient and that, therefore, they could only be used in homeopathic dilutions, i.e., potencies. This practice was scientifically supported by Rudolf Arndt (psychiatrist, 1835 – 1900) and Hugo Schulz (pharmacologist, 1853 – 1932) through a quantitative differentiation of the medicinal effect on bio-systems and still applies as the Arndt-Schulz Principle. It states:

- 1) Weak stimuli stimulate the life functions (retro-action of homeopathic preparations);
- 2) Moderately strong stimuli accelerate them;
- 3) Strong stimuli act as inhibitors; and
- 4) The strongest stimuli suspend the life functions.

Since several tissue-incompatible substances are usually involved during the development of a disease, the simultaneous use of several potentised “anti-toxins”, as present in the anti-homotoxic preparations, is justified. Against the background of the conflicting medicinal and therapeutic concepts promulgated in humoral pathology, cellular pathology, molecular pathology, and related fields including modern cybernetics, the German physician Dr. Hans-Heinrich Reckeweg formulated Homotoxicology in 1952. This conception was developed from homeopathy for the purpose of providing a holistic perspective on the synthesis of medical science.

**Aromatherapy** is a treatment modality of using plant materials and aromatic plant oils for the purpose of altering an individual's mood, cognitive, psychological or physical well-being. The use of essential oils for therapeutic, spiritual, hygienic and ritualistic purposes dates back to ancient civilizations of the Chinese, Indians, Egyptians, Greeks and Romans.

**Ayurvedic medicine** (also called Ayurveda) is one of the world's oldest medical systems. Ayurveda is based on the concepts of longevity and the nourishment of life. It originated in India and has evolved over thousands of years. In the United States and Europe, Ayurvedic medicine is considered a complementary health approach. Many products and practices used in Ayurvedic medicine are also used on their own as complementary approaches – for example, herbs, massage, and specialized diets.

**Battlefield Acupuncture (BFA)** is an ear acupuncture technique consisting of placing five ASP (semi-permanent) needles in the ear in a specific sequence starting with the Cingulate Gyrus, Thalamus, Omega 2, Shen Men and Point Zero to reduce acute and chronic pain. (*See each specific point for description.*)

**Benson, Herbert** is an American Cardiologist who has been a pioneer in Mind/Body Medicine, and one of the first Western physicians to bring spirituality and healing into medicine. Throughout his 40+-year career, Dr. Benson has worked to build awareness of Mind/Body Medicine, to validate it through research, and to bridge the gap between Western and Eastern medical practices. Dr. Benson is the Director Emeritus of the Benson-Henry Institute (BHI), and Mind/Body Medicine Professor of Medicine, Harvard Medical School.

**Biofeedback** is a training technique that enables a patient to gain some element of voluntary control over autonomic body functions; based on the principle that a desired response is learned when received information such as a recorded increase in skin temperature (feedback) indicates that a specific thought complex or action has produced the desired physiologic response.

**Buddhism** is a religious or philosophical system that encompasses a variety of traditions, beliefs and spiritual practices largely based on the teachings attributed to Gautama Buddha (563 – 400 BC estimated) or widely known as Buddha or the “awakened one”.

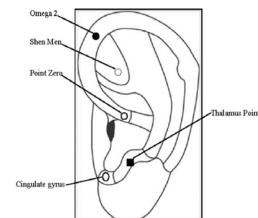
**Bureaucracy** is a system of government in which most of the important decisions are made by state officials rather than by elected representative.

**CAMBrella** is an acronym word from CAM and Umbrella words. It represents the European research network for Complementary and Alternative Medicine (CAM) that conducted a research program into the situation of CAM in Europe between 2010 and 2012.

**Chinese medicine** – see *TCM*.

**Chronic pain** is ongoing or recurrent pain, lasting beyond the usual course of acute illness or injury or more than 3 to 6 months, and which adversely affects the individual's well-being. A simpler definition for chronic or persistent pain is pain that continues when it should not.

**Cingulate gyrus** is an auricular acupuncture point situated in the intra-tragal notch on the cartilaginous ring of the ear. The cingulate gyrus is an anatomical point representing the cingulate gyrus of the brain. The cingulate gyrus is a part of the cingulate cortex, which is situated within the cerebral cortex. The cingulate cortex is part of the limbic cortex; the system related to emotions, learning and memory.



**Complementary and Alternative Medicine (CAM)** is a group of diverse medical and healthcare practices that are not generally considered to be part of “conventional medicine” or that which is not taught in Western medical schools. Complementary refers to those modalities to augment. Alternative refers to those modalities used instead of.

**Complementary and Integrative Medicine (CIM)** is the revised terminology of Complementary and Alternative Medicine (CAM) to include those practices that are “integrative”. Integrative medicine is characterized by its focus on restoring optimal health and well-being through the use of a wide array of evidence-based modalities and approaches.

**Cold** [1] is the Chinese concept that Cold in the body causes clinical manifestations similar to those of cold in the natural environment, e.g., low temperature, deceleration of activity, and congealing. Diseases caused by cold evil result from severe or sudden exposure to cold, e.g., catching cold, excessive consumption of cold fluids, or exposure to frost. They bear the following features:

- 1) A generalized or local signs of cold, such as aversion to cold, desire for warmth, pronounced lack of warmth in the extremities, and cold and pain in the lower abdomen;
- 2) Cold, thin, clear excreta;
- 3) Tendency to develop Qi stagnation and blood stasis, characterized by severe pain; and
- 4) Contracture and hypertonicity of the sinews.

**Comprehensive Pain Management Campaign Plan (CPMCP)** is the standardized DoD and VHA vision and approach to pain management to optimize the care for warriors and their families.

**Coping** is described as the active and conscious strategies to deal with problems/stressor (i.e., illness, distress). These can be either problem or emotion focused to solve the problems, avoid or minimize the stressor, or to adapt to circumstances.

**Culture** is a way of life of a group of people to include customs, behaviors, beliefs, values, morals, laws and symbols that are accepted and passed from one generation to the next. Culture is a dynamic process that changes as the society changes.

**Curanderismo** describes a broad healing tradition of Latin America. The word is derived from the Spanish verb *curar*, which means, “to heal”. There are seven pillars of Curanderismo, which represent the blending of the ancient civilizations with the native populations.

**Curandero** is a traditional Native healer, found in the United States and Mexico. Curandero is Spanish for “healer”.

**Cure** is often described as the absence of disease or illness; however, cure also represents an improved quality of life, which supports the process of healing, even in the presence of continued disease or illness.

**Dampness** [1] – In the conceptual meaning of Chinese medicine, Dampness in the body is qualitatively analogous and causally related to dampness in the natural environment. It is associated with damp weather or damp climates and with stagnant water in places where ground drainage is poor. To some extent, it is seasonal in nature, tending to occur when the weather is wet or damp. Dampness has a number of characteristics:

- a) It is clammy, viscous and lingering. Dampness diseases are persistent and difficult to cure; and
- b) Dampness tends to stagnate and the patient may complain of physical fatigue, heavy, cumbersome limbs, and heavy-headedness, aching joints and inhibited bending and stretching.

**Deficiency** refers to emptiness or weakness of vital substances of the body.

**Descartes, René (1596 – 1650)** was a French philosopher, mathematician and scientist. He is known as the father of modern Western philosophy. Descartes is best known for his concept of the mind and body separation, including the superiority of the former (“Cogito ergo sum” translated as “I think, therefore I am”).

**Doctor/patient relationship** simply put is the relationship between the patient and doctor. However, the doctor/patient relationship is central to the practice of healthcare and forms one of the foundations of contemporary medical ethics. Studies show that the doctor/patient relationship can be as important to the overall medical outcome as any treatment. It is based on trust, confidence, rapport, communication, respect, shared values and perspectives about quality of life, disease, illness and health.

**Drugless treatments** are a group of modalities that encompass non-drug approaches often used by integrative medicine professionals to complement conventional treatment and facilitate healing. Acupuncture, Reiki, manipulation as well as Integrative Medicine team approaches are examples of drugless treatments.

**Dynamic system** – In mathematics, a dynamical system is a set of relationships among two or more measurable quantities, in which a fixed rule describes how the quantities evolve over time in response to their own values.

**Eastern medicine** is a collective group of medical practices typically based on the Eastern or ancient practices. Eastern practices are based on the inductive method (observations of nature with few statements on the laws or theories of nature). The Eastern approach typically considers health as balanced states versus disease as unbalanced states. It adapts to the environment. Examples include Traditional Chinese Medicine, Ayurveda and homeopathy. The division of “Eastern” and “Western” is an artificially constructed paradigm (*see Chapter 12*).

**Effectiveness** is the degree to which something is successful in producing a desired result. Effectiveness relates to how well a treatment works in the clinical practice of medicine.

**Efficacy** is the ability to produce a desired or intended result. It is the capacity for beneficial changes or therapeutic effect of a given intervention. Efficacy measures how well a treatment works in structured clinical trials or laboratory studies.

**Energetics** is a therapeutic approach that is based on the energy changes involved in the chemical reactions within living tissue.

**Energy medicine (therapy, healing)** is a sub-practice of “alternative medicine” that manipulates the energies (often subtle energies) of the human body to create a positive influence. Examples include Reiki, Therapeutic Touch, Alpha-stimulation and spiritual healing. Acupuncture can be considered a form of energy medicine since acupuncture is based on the movement of energy (Qi).

**Evidence-Based Practice (EBP)** is the term applied to those practices that have accepted, well-designed and conducted research-based evidence to support the effectiveness or efficacy of the practice. It is based on the terminology of evidence-based medicine. EBP is an approach that is intended to optimize medical decision-making in the determination of appropriate treatment plans. The term was introduced in 1992.

**Exercise** is any bodily activity that enhances or maintains physical fitness and overall health and wellness. Exercise benefits the immune, cardiovascular and musculoskeletal systems as well as provides stress reduction, improved mood, self-esteem and mental health.

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**Guided imagery** is the use of words and music to evoke positive imaginary scenarios in a subject, with a view to bringing about some beneficial effect.

**Hatha yoga** is a type of yoga consisting of physical exercises and breathing control.

**Healing** is the process of restoration of health from an unbalanced, disease, injured or damaged individual. Healing comes from the old English to “restore to sound health” of Germanic origin, which is related to the Dutch, *heelen* and German *heilen*, which mean “whole”.

**Healing touch** is a therapy involving hands-on contact with the patient, combined with other spiritual links made between patient and practitioner that help to restore and balance energy that has been depleted due to stress, illness, injury, grief, medical conditions, surgery or medical treatments such as chemotherapy and radiation.

**Health** is one of the most difficult terms to define in medicine because it is based on a multitude of factors such as individual perspectives, prescribed or expected outcomes and situations. The World Health Organization (WHO – 1948) defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The Ottawa Charter for Health Promotion (1986) describes health as “a resource for everyday life, not the object of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities”. The art of medicine is to understand and to support the patient’s definition of health based on their perspectives and goals.

**Healthcare system** is the organization of people, institutions and resources that deliver healthcare services to meet the health needs of target populations. There are four basic types of healthcare systems. These include:

- 1) Government controlled and paid through tax payments (Beveridge, English);
- 2) Insurance-based, but inclusive of all and non-profitable (Bismarck, German);
- 3) Private sector delivered but funded through government-run insurance program (National Health Insurance Model, Canadian); and
- 4) Out-of-pocket or market driven.

Countries can have variations and combinations of all models such as the USA, where “government controlled” type of healthcare is provided for Veterans and citizens over 65 whereas employer provided insurance is provided for most Americans. Some of the very wealthy and poor will opt/forced to have out-of-pocket healthcare.

**Heart Rate Variability (HRV)** is the physiological phenomenon of variation in the time interval between heartbeats. It is measured by the variation in the beat-to-beat interval.

**Heat** [1] is the opposite of the Chinese medical concept of Cold. It can give rise to symptoms as fever, fear of heat, desire for coolness, thirst, red face, red eyes, reddish urine, red tongue with yellow tongue coating and a rapid pulse.

**Herbal medicine** is the discipline of medicine that deals with herbs (plant or plant part) used for its scent, flavor, or therapeutic properties. Herbal medicines are one type of dietary supplement. They are sold as tablets, capsules, powders, teas, extracts, and fresh or dried plants. People use herbal medicines to try to maintain or improve their health.

**Hermetic books** are a collection of heterogeneous body of works attributed to the philosopher Hermes Trismegistus. The books are mostly philosophical, theosophical, astrological, magical or alchemical in nature. Hermes Trismegistus may be a representation of the syncretic (the combining of different and often contradictory beliefs while blending various schools of thought) combination of the Greek god Hermes with the Egyptian god Thoth.

**Hippocrates (460 – 370 BC)** was a Greek Physician of Classical Greece and considered to be the father of Western Medicine. The Hippocrates School of Medicine was revolutionary because it established medicine as a discipline distinct from other fields with which it had been traditionally associated. This established medicine as a profession. Hippocrates was attributed with the *Hippocrates Oath*, an oath often taken by physicians to uphold ethical standards.

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**Holistic** is the characteristic of being whole, complete, interconnected, indivisible, ordered. In medicine, the concept is used to address the entire individual and context rather than focusing only on a part or diagnosis. In biology, the concept according to which the sum of a phenomenon or system cannot be measured, reduced, observed at the level below that of the entire system.

**Homeopathy** – The alternative medical system of homeopathy was developed in Germany at the end of the 18<sup>th</sup> century. Supporters of homeopathy point to two unconventional theories: “like cures like” – the notion that a disease can be cured by a substance that produces similar symptoms in healthy people; and “law of minimum dose” – the notion that the *lower* the dose of the medication, the *greater* its effectiveness. Many homeopathic remedies are so diluted that no molecules of the original substance remain. Homeopathic remedies are derived from substances that come from plants, minerals, or animals, such as red onion, arnica (mountain *herb*), crushed whole bees, white arsenic, poison ivy, belladonna (deadly nightshade), and stinging nettle. Homeopathic remedies are often formulated as sugar pellets to be placed under the tongue; they may also be in other forms, such as ointments, gels, drops, creams, and tablets. Treatments are “individualized” or tailored to each person – it is not uncommon for different people with the same condition to receive different treatments.

**Homeostasis** is the property of a system in which variables are regulated so that internal conditions remain stable and relatively constant.

**Humoral/drain-off therapy (Purgation therapy)** – The ancient Greek theory of the four body humors (blood, yellow bile, black bile, and phlegm) that determined health and disease. The humors were associated with the four elements (air, fire, earth, and water), which in turn were paired with one of the qualities (hot, cold, dry, and moist). A proper and evenly balanced mixture of the humors characterized health of body and mind; an imperfect balance resulted in disease. Temperament of body or mind also was supposed to be determined, for example, sanguine (blood), choleric (yellow bile), melancholic (black bile), or phlegmatic (phlegm). In Ayurvedic medicine, cleansing the body of toxins can be done by the taking of laxatives. Synonym: *virechana*.

**Integrative Health and Healing (IH2)** is a system of medical practice that places a shared responsibility for health and healing onto the system, i.e., patient, provider, delivery and outcomes. The core principles of IH2 are patient centered, (w)holistic care, as well as empowerment and responsibility. IH2 combines all healthcare practices and disciplines, to include self-care, which are informed by scientific evidence, clinical best practices and shaped by goals and expectations. The emphasis of IH2 is on quality of life, not necessarily cures as a measure of success.

**Integrative Medicine (IM)** is the medical practice that combines conventional Western medicine with complementary and alternative treatments, all in the effort to treat the whole person. Proponents prefer the term “complementary” rather than “alternative” to emphasize that such treatments are used with mainstream medicine, not as replacements or alternatives. There are many definitions of IM. A comprehensive definition as defined by Duke University states; Integrative Medicine is characterized by the following:

- 1) The patient and practitioner are partners in the healing process.
- 2) All factors that influence health, wellness and disease are taken into consideration, including body, mind, spirit and community.
- 3) Providers use all healing sciences to facilitate the body’s innate healing response.
- 4) Effective interventions that are natural and less invasive are used whenever possible.
- 5) Good medicine is based in good science. It is inquiry-driven and open to new paradigms.
- 6) Alongside the concept of treatment, the broader concepts of health promotion and the prevention of illness are paramount.
- 7) The care is personalized to best address the individual’s unique conditions, needs and circumstances.

Practitioners of integrative medicine exemplify its principles and commit themselves to self-exploration and self-development.

**Joint Incentive Fund (JIF)** was established under Section 721 of the FY 2003 National Defense Authorization Act to provide seed money and incentives for innovative DoD/VA joint sharing initiatives to recapture purchased care,

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improve quality and drive cost savings at facilities, regional and national levels. The minimum annual contributions to the fund by DoD/VA are \$15 million each, for a total of \$30 million per year. JIF is only designated for use by the Veterans Health Administration (VHA) and Defense Health Agency (DHA) entities for direct medical sharing initiatives or for services or systems that facilitate DoD/VA interoperability. JIF should not be used to hire Military personnel, for major construction and/or major IT systems. Funds should also not be used for sustainment purposes. JIF initiatives should be executed to completion (and funding should be spent) within two years.

**Kinesiology** is the science dealing with the interrelationship of the physiological processes and anatomy of the human body with respect to movement, also known as **human kinetics**, is the scientific study of human movement. Kinesiology addresses physiological, mechanical, and psychological mechanisms. Applications of kinesiology to human health include:

- Biomechanics and orthopedics;
- Strength and conditioning;
- Sport psychology methods of rehabilitation, such as physical and occupational therapy; and
- Sport and exercise.

Individuals who have earned degrees in kinesiology can work in research, the fitness industry, clinical settings, and in industrial environments. Studies of human and animal motion include measures from motion tracking systems, electrophysiology of muscle and brain activity, various methods for monitoring physiological function, and other behavioral and cognitive research techniques. Kinesiology as described above should not be confused with applied kinesiology a controversial medical diagnostic method. The word comes from the Greek *κίνησις*, “movement” (itself from *κινεῖν* *kinein*, “to move”), and *-λογία - logia*, “study”.

**Kneipp Therapy (DEU)** is a form of hydrotherapy (water therapy) that was created by the Bavarian priest Sebastian Kneipp (1821 – 1897). Today, it still represents a holistic approach in the field of naturopathic healing and contemporary preventative medicine and is widely practiced in spas and wellness resorts throughout Europe. It is commonly also known as “Kneipping” or “Kneipp Cure”. The principle of a Kneipp Therapy is based on hot and cold showers, rinses, baths, and compresses. The interplay of hot and cold water on the skin, widens the arteries, stimulates blood flow and the metabolic system and strengthens the immune system.

**Licensed Acupuncturist (LAc)** is a provider of acupuncture whose educational focus is in acupuncture and Oriental Medicine and has obtained a 3 – 4 year master’s level degree or diploma and is licensed in one or more jurisdictions.

**Manual therapies (chiropractic, osteopathy)** contains two main basic systems (chiropraxia and osteopathy), according to its main effect of body. It places emphasis on the musculoskeletal system, hence the name – *osteo* refers to bone and *path* refers to disease. Osteopaths also believe strongly in the healing power of the body and do their best to facilitate that strength. During this century, the disciplines of osteopathy and allopathic medicine have been converging. Osteopathy shares many of the same goals as traditional medicine, but places greater emphasis on the relationship between the organs and the musculoskeletal system as well as on treating the whole individual rather than just the disease.

**Martial Arts** are a group of systems and traditions of combat practices, which are practices for self-defence, competition, physical health and fitness, entertainment as well as physical and spiritual development. It refers to a combat system of Europe from the early 1550 although it is often associated with fighting arts of Eastern Asia. The term “Martial Arts” is derived from the Latin and means “arts of Mars”. Mars was the Roman god of war.

**Medical acupuncturist** is a provider of acupuncture who is trained and licensed in Western medicine with additional training (300+ hours) and certification specifically in the area of Acupuncture as a specialty practice.

**Meditation** is similar to mindfulness – the term “meditation” has different meanings depending on the context. Generally speaking, meditation can be understood as an exercise or a practice in which the attention is focused inwards. Through meditation, a state of consciousness is cultivated that is beyond the mind and that allows insight into the true nature of reality.

**Mesopotamia** is believed to be the oldest civilization. It is the geographical area, which are present-day Kuwait, Syria and Iraq. Mesopotamia is derived from the Greek to mean the “land between rivers”. Thus, Mesopotamia was the name for the area between the Tigris and Euphrates river systems.

A **meta-study** (or analysis) is one that summarizes the results of data collected in numerous studies with the same methodological approach (e.g., mindfulness training), but in different contexts (e.g., cancer, therapy, drug-abuse prevention).

**Mindfulness** can be defined in many different ways, based on contextual perspectives. In some cases, mindfulness is referred to as a method or a spiritual practice. Other people use the term to characterize a mental state or as a personality trait (focusing on the long-term effects). In common terms, mindfulness is associated with a non-judgmental observation of thoughts, emotions and bodily sensations that can arise in a given moment.

**Mindfulness-Based Stress Reduction** (MBSR) is one of the most popular and well-evaluated mindfulness training concepts available in the western world. MBSR is an 8-week mindfulness-training program, which is based upon Buddhist meditation techniques such as sitting meditation, walking meditation, the body scan and some Hatha Yoga exercises.

**Metabolomics** is the scientific study of chemical processes involving metabolites. Specifically, metabolomics is the “systematic study of the unique chemical fingerprints that specific cellular processes leave behind”, the study of their small-molecule metabolite profiles. [1] The metabolome represents the collection of all metabolites in a biological cell, tissue, organ or organism, which are the end products of cellular processes [2]. mRNA gene expression data and proteomic analyses reveal the set of gene products being produced in the cell, data that represents one aspect of cellular function. Conversely, metabolic profiling can give an instantaneous snapshot of the physiology of that cell. One of the challenges of systems biology and functional genomics is to integrate proteomic, transcriptomics, and metabolomic information to provide a better understanding of cellular biology.

**Mysticism** is the belief that union with or absorption into the Deity or absolute, or the spiritual apprehension of knowledge inaccessible to the intellect, may be attained through contemplation and self-surrender. Mysticism is a group of distinctive practices, discourses, texts, institutions, traditions and experiences aimed at human transformation.

**National Center for Complementary and Integrative Health (NCCIH)** is the U.S. Federal Government’s lead agency for scientific research on the diverse medical and healthcare systems, practices and products that are not generally considered part of conventional medicine. The NCCIH was established in 1991 as the Office of Alternative Medicine (OAM). In 1998, the OAM was renamed the National Center for Complementary and Alternative Medicine and established as a National Institute (NIH) Center. In 2001, NCCAM and the National Library of Medicine launched *CAM on PubMed*, a comprehensive Internet source of research-based information. In 2014, NCCAM was renamed the NCCIH to more accurately reflect the Center’s commitment to studying promising health approaches already in use by the American Public.

**National Institute of Health (NIH)** is the U.S. Federal Government Agency in medical research. NIH is part of the U.S. Department of Health and Human Services. The NIH is composed of 27 different Institutes and Centers. The roots of the NIH trace back to 1887 as a one-room laboratory created within the Marine Hospital Service (MHS), which was the predecessor agency to the U.S. Public Health Service (PHS).

**Naturopathy (GER: “Naturheilverfahren”)** is a drugless system of healing by the use of physical methods, such as light, air, or water. Naturopathy – also called naturopathic medicine – is a medical system that has evolved from a combination of traditional practices and healthcare approaches popular in Europe during the 19<sup>th</sup> century. People visit naturopathic practitioners for various health-related purposes, including primary care, overall well-being, and treatment of illnesses. Naturopathic physicians, traditional naturopaths, and other healthcare providers are examples of providers who offer naturopathic services. Naturopathic practitioners use many different treatment approaches. Examples include:

- Dietary and lifestyle changes;
- Stress reduction;

- Herbs and other dietary supplements;
- Homeopathy;
- Manipulative therapies;
- Exercise therapy;
- Practitioner-guided detoxification; and
- Psychotherapy and counseling.

Some practitioners use other methods as well or, if appropriate, may refer patients to conventional healthcare providers.

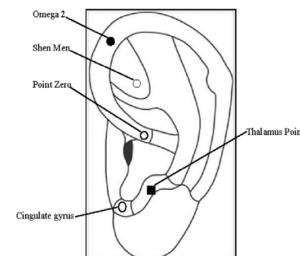
**Neural therapy (Huneke)** – Neural therapy has been described as a form of holistic medicine for treating illness and chronic pain with local anesthetic medicaments but with non-curing dosage. The idea underlying the therapy is that “interference fields” (*Störfelder*) at certain sites of the body are responsible for a type of electric energy that causes illness. The fields can be disrupted by injection, allowing the body to heal. The practice originated in 1925 when Ferdinand Huneke, a German surgeon, used a newly launched pain drug that contained procaine (a local anesthetic) on his sister who had severe intractable migraines. Instead of using it intramuscularly as recommended he injected it intravenously and the migraine attack stopped immediately. He and his brother Walter subsequently used Novocaine in a similar way to treat a variety of ailments. In 1940, Ferdinand Huneke injected the painful shoulder of a woman who also had an osteomyelitis in her leg, which (before antibiotics) threatened her with amputation. The shoulder pain improved somewhat, but the leg wound became itchy. On injecting the leg wound the shoulder pain vanished immediately – a reaction he called the “phenomenon of seconds” (*Sekundenphänomen*). Neural therapy is used frequently in Mid-European countries (Austria, Germany, Hungary, Switzerland).

**Non-allopathic** is consider those practices also known as complementary and alternative, i.e., those that are not generally considered part of conventional medicine.

**North Atlantic Treaty Organization (NATO)** is an international alliance of 28 Nations with the mission to safeguard the freedom and security of its members through political and Military means. NATO was officially formed on 4 April 1949 with the signing of the *Washington Treaty* in response to the threat posed by the Soviet Union as well as the prevention of European nationalist militarism through a North American presence in Europe. Further, NATO was formed to encourage European political integration. Currently, NATO membership is open to “any other European State in a position to further the principles of the NATO treaty and to contribute to the security of the North Atlantic area.

**Off-label** is the practice of prescribing a medication/pharmaceutical drug for an illness or disease other than the approved indication of the medication, i.e., Federal Drug Administration (FDA) label. The *Archives of Internal Medicine* reported that 73% of off-label use has little or no scientific support (2006).

**Omega 2 auricular acupuncture point** is situated on the outer rim of the pinna. Omega 2 point is a functional point rather than an anatomical point since there is no corresponding brain structure. Omega 2 reflects the inner feeling and perception of the person as related to the surrounding personal space. It represents the connection of the self to the world as well as how one perceives the world.



**Orthomolecular therapy** is a form of alternative medicine aimed at maintaining health through nutritional supplementation and based on the idea that there is an optimum nutritional environment in the body and that diseases reflect deficiencies in this environment. Treatment for disease, according to this view, is an attempt to correct, “imbalances or deficiencies based on individual biochemistry” by use of supposedly “natural” substances such as vitamins, minerals, amino acids, trace elements and fatty acids. The notions behind orthomolecular medicine are not supported by sound medical evidence and the therapy is not effective; even the accuracy of calling the orthomolecular approach a form of medicine has been questioned since the 1970's. The approach is sometimes referred to as megavitamin therapy because its practice evolved out of, and in some cases still uses, doses of vitamins

and minerals many times higher than the recommended dietary intake. Orthomolecular practitioners may also incorporate a variety of other styles of treatment into their approaches, including dietary restriction, megadoses of non-vitamin nutrients and mainstream pharmaceutical drugs.

**Oxidative stress** reflects an imbalance between the systemic manifestation of reactive oxygen species and a biological system's ability to readily detoxify the reactive intermediates or to repair the resulting damage. Disturbances in the normal redox state of cells can cause toxic effects through the production of peroxides and free radicals that damage all components of the cell, including proteins, lipids, and DNA. Oxidative stress from oxidative metabolism causes base damage, as well as strand breaks in DNA. Base damage is mostly indirect and caused by Reactive Oxygen Species (ROS) generated, e.g.,  $O_2^-$  (superoxide radical), OH (hydroxyl radical) and  $H_2O_2$  (hydrogen peroxide). Further, some reactive oxidative species act as cellular messengers in redox signaling. Thus, oxidative stress can cause disruptions in normal mechanisms of cellular signaling.

**Oxygen/ozone therapy** is a bio-oxidative therapy that involves administering small amounts of diluted ozone and hydrogen peroxide into the body for the prevention and treatment of disease. Licensed physicians in Germany have used ozone therapy since the early 1960's. The American, Dr. C.H. Farr, a nominee for the 1993 Nobel Prize in Medicine, developed the use of hydrogen peroxide in ozone therapy. The philosophy behind bio-oxidative therapies is a simple one. The use of hydrogen peroxide and ozone in medicine is based on the belief that the accumulation of toxins in the body is normally burnt up by the process of oxidation, a process wherein a substance is changed chemically because of the effect of oxygen on it. Oxidation breaks the toxins down into carbon dioxide and water, and eliminates them from the body. However, if the oxygen system of the body is weak or deficient (whether through lack of exercise, environmental pollution, poor diet, smoking, or improper breathing), our bodies cannot eliminate them adequately and a toxic reaction can occur. In minor cases, a toxic build-up can lead to fatigue, while a wide range of diseases can result when poor oxygenation is chronic.

**P value (p value)** is a statistical term that refers to the probability of obtaining by chance a result at least as extreme as that observed, even when the null hypothesis is true and no real difference exists; when  $P$  is  $< 0.05$ , the sample results are usually deemed significant at a statistically important level and the null hypothesis is rejected. (See also *Type I ERROR*.)

**Paradigm** is a distinct set of concepts or thought patterns, including theories, research methods, postulates and standards for what constitutes legitimate contributions to field. The word paradigm comes from the Greek “paradeigma” which means, “pattern, example, sample” and the Greek verb “paradeiknumi” which means, “exhibit, represent, expose”. The root is from “para” which means, “beside, beyond” and “deiknumi” which means, “to show, to point out”.

**Passive participation modality** is a treatment modality in which the individual does not engage in the treatment. The patient has treatment protocol performed on them or medication prescribed to them. Examples of passive participation modalities include: surgery; acupuncture; and prescriptions.

**Pathogenesis** is the biological mechanism that leads to the disease states.

**Patient (or person)-centered care** is care that is respectful of and responsive to individual patient (or person) preferences, needs, and values, and ensuring that patient values guide all clinical decisions.

**Phytomedicine** refers to the herbal-based traditional medical practices that use various plant materials in modalities considered both preventive and therapeutic.

**Point zero** [3] is an auricular acupuncture point situated at the junction of the conchal ridge and the root of the ascending helix of the ear. Functionally, point zero was initially thought as the reference point for auricular point electro-detection, i.e., it serves to “zero” or set the sensitivity of auricular electro-diagnostic devices. However, it is much more than that. It is one of the most recognized auricular points and used in the treatment of many ailments. Point zero is known to have powerful influence in the treatment of various conditions to include pain, sedation, addiction and inflammation although it is not associated with any specific organ of the body.



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**Post-Traumatic Stress Disorder (PTSD)** is a mental illness that can develop after an individual is exposed to one or more traumatic events or other threats on a person's life. Symptoms include: disturbing recurring flashbacks; avoidance behaviors; hyperarousal; and a sense of numbness.

**Prana** is a Hindu word meaning "breath", considered as a life-giving force.

**Pranic healing** is an ancient science and art of healing that utilizes prana (or chi/qi/ki) or life energy and energy centers to heal diseased energy levels.

**Prophetic medicine** describes the Arabic medicine as practiced within the Islamic system of ethnics. It was to be true medical knowledge derived from the revelations of the Prophet, Muhammad.

**PROPresence** is a German mindfulness-training program, which was designed for the rehabilitation of deployment related stress in German Military personnel. On one part, this 3-week mindfulness-training program is based upon traditional Buddhist meditation techniques such as sitting meditation, walking meditation, the body scan, and on the other part, there are exercises for the integration of the left and right hemisphere of the brain.

**Proteomics** is the large-scale study of proteins, particularly their structures and functions. Proteins are vital parts of living organisms, as they are the main components of the physiological metabolic pathways of cells. The term proteomics was first coined in 1997 to make an analogy with genomics, the study of the genome.

**Randomized Controlled Trial (RCT)** is a type of scientific experiment, which included randomization to one or other treatment groups to include a "control group". The control group is the treatment group of the study that does not receive the treatment being investigated. RCT are often considered the "gold standard" of medical research; however, the RCT is not always applicable or achievable.

**Rhazes (Muhammad ibn Zakariya al-Razi) (845 – 925 AD)** was a Persian philosopher, physician, mathematician, alchemist and chemist. He made fundamental contributions to various fields of science to include medicine. He is considered to be the father of pediatrics and a pioneer of ophthalmology.

**Rituals** are enactments based on cultural belief and values. Rituals can be social, Military, religious, or spiritual. Traditions of a community prescribe the sequence of activities, which can involve gestures, words and objects often performed in a sequestered place and in a set sequence.

**Qi** [1] is the basic concept of Chinese medical theory. Translated as air, gas, vapor, smell, force; pronounced "chee" as in "cheese", transcribed in Wade-Giles as *ch'i*, and sometimes written as "ki" and pronounced as the English "key" in the Japanese tradition. Qi is the alleged energy that circulates through a network of meridians and acupuncture points that have been described by the Chinese for over 5,000 years but the concept has not been confirmed by research.

**Qigong** is a Chinese system of physical exercises and breathing control related to T'ai Chi.

**Quality of Life (QoL)** is the general well-being of individuals and societies. QoL has a wide range of contexts, including the fields of international development, healthcare, politics and employment.

**Reflexologists** work from maps of predefined pressure points that are located on the hands and feet. These pressure points are reputed to connect directly through the nervous system and affect the bodily organs and glands. The reflexologist manipulates the pressure points according to specific techniques of reflexology therapy. By means of this touching therapy, any part of the body that is the source of pain, illness, or potential debility can be strengthened through the application of pressure at the respective foot or hand location.

**Reflexology** is a therapeutic method of relieving pain by stimulating predefined pressure points on the feet and hands. This controlled pressure alleviates the source of the discomfort. In the absence of any particular malady or abnormality, reflexology may be as effective for promoting good health and for preventing illness as it may be for relieving symptoms of stress, injury, and illness.

**Reiki** is a healing technique based on the principle that the therapist can channel energy into the patient by means of touch, non-touch or visualization, to activate the natural healing processes of the patient's body and restore physical and emotional well-being.

**Relaxation response** refers to one's personal ability to make his/her body release chemicals and brain signals that make one's muscles and organs slow down and increases blood flow to the brain.

**Religiosity** – Religion is an institutional and culturally determined approach, which organizes the collective experiences of people (faith) into a closed system of beliefs and practices ('form'). Often associated with specific faith traditions (i.e., Christianity, Islam, Buddhism) and their rituals, practices and convictions.

**Salutogenesis** is the process of healing, recovery, and repair. The term was first used by Aaron Antonovsky to contrast with pathogenesis.

**Salutogenic approach** describes the approach that focuses on factors that support human health and well-being, rather than on factors that cause disease. Aaron Antonovsky, a medical sociologist, coined the term in 1979.

**Self-care** is any intentional actions that an individual takes to improve their physical, mental or emotional health. Self-care techniques provide a source of *doing* by patients instead of *having something done* to them.

**Shaman** is an individual who enters an altered state of consciousness in order to acquire knowledge, power and the ability to help others. Typically, shamans use drums to call upon spiritual allies. Shamans are regarded as having the access to, and influence in, the world of good and evil spirits, especially among societies of Northern Asia and North America.

**Shen Men** [4] is an auricular acupuncture point situated at the apex of the triangular fossa. It means "Heavenly or Spirit Gate". It is one of the most recognized auricular points and used in most ailments. Neuropsychoemotionally, it is considered to alleviate apprehension, fear, and anxiety and help regulate the sympathetic nervous system. It is used as an acupuncture point for the tranquilizing effect. It is a functional point and not an anatomical point, since it is not associated with any organ or system.



Chinese Shen Men

**Shiatsu massage therapy** is a form of Japanese bodywork based on the theoretical framework of Traditional Chinese Medicine. The *shiatsu* means, "finger pressure". Shiatsu techniques include massages with fingers, thumbs, and palms; assisted stretching; and joint manipulation and mobilization. To examine a patient, a shiatsu practitioner uses palpation and, sometimes pulse diagnosis. Shiatsu derives from a Japanese massage modality called *anma* which was itself adapted from *tui-na*. *Tui-na* is a Chinese bodywork system that arrived in Japan by at least the Nara period (710 – 793 CE). Tokujiro Namikoshi (1905 – 2000) founded a shiatsu college in the 1940's, and is often credited with inventing modern shiatsu.

**Spirituality** has multiple definitions. A basic definition is that spirituality is a complex and multi-dimensional construct, and can be defined as an open and individual experiential approach in the search for meaning and purpose in life ('content'). Spirituality can be found through religious engagement, through an individual experience of the divine, and/or through a connection to others, environment and the sacred.

**Stagnation** [1] is reduced activity. In physiology it refers either to depressed qi dynamic (frustrated physiological activity) or to flow stoppage due to congestion. The term also describes inhibition of normal emotional activity, expressing itself in the form of oppression, frustration, and irascibility.

**Supplementation** is the use of *supplements* for a therapeutic benefit. Supplements are often described as dietary/nutritional, performance enhancing or weight management. Supplements include: herbals; vitamins; minerals; amino acids; concentrate; metabolite; constituent; or extract.

**Syndrome** – [1] In Chinese medicine a syndrome or pattern is a manifestation of human sickness indicating the nature, location, or cause of sickness. The concept of syndrome or pattern is distinct from that of disease (as a specific kind of morbid condition). A disease may take the form of different patterns.

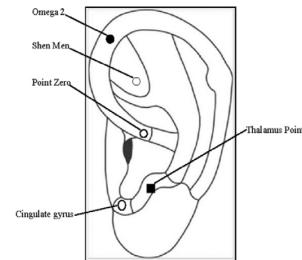
**Systems biology** is the computational and mathematical modeling of complex biological systems. An emerging engineering approach applied to biomedical and biological scientific research, systems biology is a biology-based inter-disciplinary field of study that focuses on complex interactions within biological systems, using a holistic approach (holism instead of the more traditional reductionism) to biological and biomedical research.

**Systems thinking** is the process of understanding how those things which may be regarded as systems influence one another within a complete entity, or larger system. In nature, systems thinking examples include ecosystems in which various elements such as air, water, movement, plants, and animals work together to survive or perish. In organizations, systems consist of people, structures, and processes that work together to make an organization “healthy” or “unhealthy”. Systems thinking has roots in the General Systems Theory that was advanced by Ludwig von Bertalanffy in the 1940’s and furthered by Ross Ashby in the 1950’s. Jay Forrester and members of the Society further developed the field for Organizational Learning at MIT, which culminated in the popular book The Fifth Discipline by Peter Senge, which defined Systems thinking as the capstone for true organizational learning.

**T'ai Chi** is a form of stylized, meditative exercise, characterized by methodically slow circular and stretching movements and positions of bodily balance. Originally a Martial Art, it is mainly practiced today as an excellent form of exercise with many health benefits.

**Taekwondo** is an “empty-hand” combat form that entails the use of the whole body. Tae means “to Kick” or “Smash with the feet”, Kwon implies “punching” or “destroying with the hand or fist”, and Do means “way” or “method”.

**Thalamus** is an auricular acupuncture point situated on the anti-tragus. The point is both anatomical (related to the thalamus of the brain) as well as functional. The thalamus is located in the forebrain above the midbrain; composed of four nuclei. The thalamus serves as the relay center between the peripheral (body) and the cerebral cortex (brain) for the transmission of pain. It also plays an important role in the sleep and wakefulness states.



**Thoth** was an Egyptian god who was the inventor of art. His writings, part of the Hermetic Books, were inscriptions upon pillars of stone. Thoth is often depicted as a man with the head of an ibis or baboon.

**Total Force Fitness (TFF)** is a framework for building and maintaining health, readiness and performance for the U.S. Department of Defense. The TFF program views health, wellness and resilience as a holistic concept wherein optimal performance requires connections among mind, body, spirit and family/social relationships.

**Traditional Chinese Medicine (TCM)** [2] is a broad range of medical practices sharing common concepts which have been developed in China and are based on a tradition of more than 2,000 years, including various forms of herbal medicine, acupuncture, massage, exercise and dietary therapy.

**Transcendental meditation** is not considered to be an open-mind meditation, like mindfulness meditation. The practice of TM is primarily based upon the use of mantras in a sitting position.

**Transcriptomics** – The transcriptome is the set of all RNA molecules, including mRNA, rRNA, tRNA, and other non-coding RNA transcribed in one cell or a population of cells. It differs from the exome in that it includes only those RNA molecules found in a specified cell population, and usually includes the amount or concentration of each RNA molecule in addition to the molecular identities.

**Trauma** is any physical or emotional injury due to sudden or violent action, exposure to dangerous toxins or profound shock.

**Traumatic Brain Injury (TBI)** is an injury to the brain by an external force. TBI are classified based on severity (mild, moderate (mTBI), severe) or mechanism of injury (closed or penetrating trauma). The symptoms and degree of resultant debilitation is related to the area of the brain injuries. Most common symptoms of a TBI include headaches, memory difficulties and emotional disturbances. Mild TBI are also known as a concussive event leading to a concussion.

**Type I error** is a statistic term in which there is an incorrect rejection of a true null hypothesis; also known as a false positive.

**Unani** is the term for the Perso-Arabic traditional medicine as practiced in Mughal India and the Muslim culture in South Asia and present day Central Asia. Unani is from the Arabic “Yunani” for “Greek” because the system of medicine was based on the teachings of the Greek Physicians Hippocrates and Galen. Unani medicine is based on the classical four humours: phlegm; blood; yellow bile; and black bile.

**United States Air Force Acupuncture and Integrative Medicine Center** is the only full time acupuncture center in the United States Department of Defense. The mission is education, patient care and research. It is located on Joint Base Andrews about 15 miles from Washington, DC, USA.

**Vedas** are a large body of texts originating in India. The Vedas are considered to be revelations seen by ancient sages after intense meditation. The Hindu attribute the Vedas to Brahma (Hindu creator god). There are Vedas: Rigveda, Yajurveda, Samaveda and Atharvaveda with each sub-divided into four major text types. The text types include the Samhitas (mantras and benedictions), Aranyakas (rituals, ceremonies, sacrifices and symbol-sacrifices), Brahmanas (rituals, ceremonies, sacrifices) and Upanishads (meditation, philosophy, spiritual knowledge). The Upasanas are a fifth recognized text type, which focuses on worship.

**War-related, Trauma Spectrum Response (wrTSR)** is the constellation of post-traumatic-related conditions induced by exposure to deployment and battle. Components of wrTSR include: PTSD; TBI; substance abuse; headaches; chronic pain as well as somatic, cognitive and emotional dysfunctions.

**Watsu**, also known as Water-Shiatsu, is a therapeutic form of aquatic bodywork, which is performed in warm water (35°C). While supported by the Watsu-therapist, the patient is being floated, stretched and cradled in the water experiencing a mix of weightlessness, massage, muscle relaxation and joint-mobilization.

**Western medicine** is a collective group of medical practices also known as “conventional medicine”. Western Medicine is based on hypothetical deduction and divides health from disease. Whereas “Eastern Medicine” adapts to the environment, Western medicine often changes the environment. The division of “Eastern” and “Western” is an artificial constructed paradigm (*see Chapter 12*).

**Yang** [1] is the bright, male, active principle that stands in complementary opposition to Yin.

**Yin** [1] is the dark, female, receptive principle that stands in complementary opposition to Yang.

**Yoga** is a term derived from the Sanskrit word *yug*, which represented a theological practice believed to lead to the unification of self with the Divine. Yoga is thought to date back to pre-Vedic tradition. It was considered to be given directly from God. The foundation is based on the suppression of all activities so that one can identify and separate the self from the body, mind and will thus obtaining spiritual liberation. The modern scientific study of yoga began in the West in the mid 1800’s. Currently, much of the West considers yoga as a form of exercise.

## References:

- [1] Wiseman, N. and Ye, F., “A Practical Dictionary of Chinese Medicine”, First Edition, 1998, Paradigm Publications, Brookline, MA, USA.
- [2] National Center for Complementary and Integrative Health, USA.
- [3] Frank, B. and Soliman, N., “Zero Point: A Critical Assessment through Advanced Auricular Therapy”.
- [4] Frank, B. and Soliman, N., “Shen Men: A Critical Assessment through Advanced Auricular Therapy”.

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# Terms of Reference

## I. ORIGIN

### A. Background

The past twenty years have seen the increasing acceptance of Complementary and Alternative Medicine (CAM) or integrative medicine in the treatment or prevention of an increasing number of conditions. Data show that more than 50% of the military population, including dependents, has used CAM interventions in recent years, and 66% of active duty personnel use dietary supplements. Military personnel are increasingly taking charge of their own health, without resorting to the usual military medical services. More and more try to stay away from prescription or Over-The-Counter (OTC) drugs because of the side effects, and for many, this self-empowerment is shown by their increasing use of natural products, or non-drug therapies such as acupuncture, homeopathy, magnets, laser stimulation, yoga, mind-body interventions etc.

Integrative medicine is used, either by prescription, or more frequently without medical supervision, to increase stamina, performance and operational capacity, to alleviate chronic pain without side effects, or to help personnel coping with PTSD or mild TBI outcomes. For the military leadership and the health care professionals in charge of this specific population, it is critical to acquire a better knowledge on these integrative or CAM interventions, and the potential impact of the use of these modalities on military medical preparedness. As increasingly medical care within the NATO environment is carried out in a multinational setting, it is crucial that medical personnel of each nation understand the integrative modalities which may have been used by their patients from other Nations, and which in some cases the patients will expect to be provided for them in the NATO environment, as they are at home (in accordance with MC 326/2 and AJP-4.10 (A)).

### B. Justification (Relevance for NATO)

The past twenty years have seen the increasing acceptance of Complementary and Alternative Medicine (CAM) or integrative medicine in the treatment or prevention of an increasing number of conditions. Data show that more than 50% of the military population, including dependents, has used CAM interventions in recent years, and 66% of active duty personnel use dietary supplements. Military personnel are increasingly taking charge of their own health, without resorting to the usual military medical services. More and more try to stay away from prescription or Over-The-Counter (OTC) drugs because of the side effects, and for many, this self-empowerment is shown by their increasing use of natural products, or non-drug therapies such as acupuncture, homeopathy, magnets, laser stimulation, yoga, mind-body interventions etc.

## II. OBJECTIVES

The objectives of this RTG are:

- i) Identify and evaluate countries' data on the use of CAM among military personnel.
- ii) Determine how personnel in each country access CAM interventions (directly or by prescription), and with what frequency.
- iii) Assess how important, accepted, and regulated is the use of CAM in the therapeutic arsenal.
- iv) Share all available research on the indications and effects of any type of CAM interventions, as well as any possible adverse effects on military readiness.

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### III. RESOURCES

#### A. Membership

Lead Nation: USA.

Participating Nations: DEU, FRA, HUN, ITA, NLD and USA.

Chairman: COL Richard P. Petri, Jr., MD, USA.

Nations willing/invited to participate: CAN, CZE, DEU, FRA, GBR, GRC, NLD, NOR and USA.

#### B. National and/or NATO Resources Needed

Meeting facilities.

#### C. RTA Resources Needed

The first meeting could take place at RTA/HQ in Paris to benefit from the RTA staff expertise on site.

### IV. SECURITY CLASSIFICATION LEVEL

The security level will be UNCLASSIFIED/UNLIMITED.

### V. PARTICIPATION BY PARTNER NATIONS

All PFP, MD and preferred Contact countries are invited.

Contact Nations: AUS, JPN, NZL

### VI. LIAISON

Liaison to COMEDS to be considered.

# Acknowledgements

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## **COL Richard P. Petri, Jr., MC**

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## **Fred Zimmermann, MA**

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**This figure is from the Bhagavad Gita. Excerpted from the presentation by Dr. Natalie Babouraj at the 2<sup>nd</sup> committee meeting in Bologna, Italy, 19-21 October 2011.**

Prince Arjuna (left) in discussion with Lord Krishna about struggling with a moral dilemma on the battlefield in the Kurukshetra War. This is a metaphysical allegory about individuals looking inward to improve their own well-being. This figure can be interpreted to represent the Yoga Kormas (or "sheaths") on the path to self-enlightenment (equivalent to the five elements in Eastern philosophies). The Kormas include physical (the horse harness), energy (the horses), mental (the carriage), wisdom (Prince Arjuna), and bliss (Lord Krisna), ending in "self".

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# Integrative Medicine Interventions for Military Personnel

## (STO-TR-HFM-195)

### Executive Summary

The health of a force is crucial to its Military readiness. Decreasing military budgets, global economic stagnation, and increasing medical healthcare cost threaten the sustainability of Military healthcare systems. Furthermore, these conditions risk both the individual's as well as the organization's collective health status significantly. Therefore, current healthcare systems must adapt.

Over the past four decades, there has been a grassroots utilization of Complementary and Alternative Medicine (CAM) by societies. Dissatisfaction with current systems and medication side effects, as well as preferences for "natural treatments" and modalities that align with personal beliefs and values are reasons why patients are seeking CAM. Military personnel are utilizing CAM at the same or higher rate than their civilian counterparts. Prayer/faith, herbals and supplements, acupuncture, and meditation are some of the more frequently used modalities.

The objective of the North Atlantic Treaty Organization (NATO)'s Human Factors and Medicine Panel Research Task Group 195 (RTG HFM-195) was to identify and evaluate the various countries' data on the utilization (rationale, frequency, accessibility) of CAM among Military personnel, learn about the acceptability of CAM by the leadership of Military organizations, and review briefly the current regulatory and legal status of CAM utilization and its implementation. This RTG was set up as an exploratory committee in a first step for further RTGs, conferences, and symposia that could focus on NATO-wide implementation of selected CAM modalities (e.g., acupuncture, meditation/mindfulness programs, movement/yoga), with ongoing analysis of efficacy, cost-effectiveness, suitability, and acceptability. Furthermore, acceptable terminology, regulatory policies, and educational literature need to be developed. Cross-cultural initiatives and research projects are paramount to expanding perspectives and understanding. This could ultimately improve healthcare systems and increase available treatment options for patients.

The highlights of the RTG findings are published in this report. Historical and cultural perspectives of several medical systems are briefly reviewed to understand "what's old may be new again". Healthcare was evaluated from the point of view of individual treatment modalities (acupuncture / Battlefield Acupuncture (BFA), meditation/mindfulness, biofeedback, spirituality, etc.), whole medical healthcare systems (Traditional Chinese Medicine, Ayurveda, Tibetan medicine), and new proposed paradigms (Integrative Health and Healing (IH2), systems biologic approach, trauma spectrum disorder). Available studies on current CAM utilization and treatment programs are also presented.

The overall recommendation of the RTG was to have continued review and evaluation of Integrative Health and Healing with specific attention to implementation of selected practices; education of patients, providers, and policy-makers; analysis of clinical outcomes and best practices; and establishment of collaborative research endeavours focused on cost-effectiveness, new paradigms, and models of care.

# Interventions médicales intégrantes à destination du personnel militaire

## (STO-TR-HFM-195)

### Synthèse

La bonne santé des forces militaires est essentielle à leur état de préparation. La baisse des budgets militaires, la stagnation économique mondiale et l'augmentation des frais médicaux menacent la pérennité des systèmes de santé militaires. En outre, ce contexte met en péril l'état de santé des personnes et de l'organisation dans son ensemble. Les systèmes de santé actuels doivent par conséquent s'adapter.

Au cours de ces quarante dernières années, l'utilisation des Médecines Alternatives et Complémentaires (MAC) s'est largement répandue dans nos sociétés. L'insatisfaction face aux systèmes actuels et aux effets secondaires des médicaments, ainsi que la préférence pour des « traitements naturels » et des modalités correspondant aux croyances et aux valeurs personnelles expliquent pourquoi les patients recherchent les MAC. Le personnel militaire fait autant appel aux MAC que la population civile, sinon plus. La prière ou la foi, les plantes et compléments alimentaires, l'acupuncture et la méditation sont quelques-unes des modalités les plus fréquentes.

L'objectif du Groupe de Travail de Recherche (RTG) 195 du Panel sur les Facteurs Humains et la Médecine (HFM) de l'Organisation du Traité de l'Atlantique Nord (OTAN) (RTG HFM-195) était d'identifier et d'évaluer les données provenant de divers pays sur l'utilisation (raison, fréquence, accessibilité) des MAC au sein du personnel militaire, d'en savoir plus sur l'acceptabilité des MAC pour les dirigeants des organisations militaires et de passer rapidement en revue le statut réglementaire et légal de l'emploi des MAC et la mise en pratique de ces derniers. Ce RTG a été créé en tant que comité exploratoire constituant une première étape vers d'autres RTG, conférences et colloques qui pourraient porter sur l'application, à l'échelle de l'OTAN, de modalités particulières des MAC (par exemple, l'acupuncture, des programmes de méditation / pleine conscience, le mouvement / yoga) et analyser en parallèle l'efficacité, la rentabilité, le caractère approprié et l'acceptabilité de ces MAC. De plus, il est nécessaire de développer une terminologie acceptable, des politiques réglementaires et de la littérature pédagogique. Les initiatives interculturelles et les projets de recherche sont primordiaux pour élargir les perspectives et améliorer la compréhension. Cela pourrait améliorer au final les systèmes de santé et multiplier les options de traitement disponibles pour les patients.

Les points saillants des résultats du RTG sont publiés dans le présent rapport. Les perspectives historiques et culturelles de plusieurs systèmes médicaux sont brièvement examinées pour comprendre « que quelque chose d'ancien pourrait redevenir nouveau ». Les soins de santé ont été évalués du point de vue des modalités de traitement individuelles (acupuncture / acuponcture sur le champ de bataille, méditation / pleine conscience, rétroaction biologique, spiritualité, etc.), des systèmes de santé complets (médecine traditionnelle chinoise, Ayurveda, médecine tibétaine) et des nouveaux paradigmes proposés (santé et guérison intégrantes, approche de la biologie des systèmes, troubles du spectre traumatique). Les études disponibles sur l'utilisation des MAC et leurs programmes de traitement sont aussi incluses.

La recommandation globale du RTG est de poursuivre l'examen et l'évaluation de la santé et la guérison intégrantes, en prêtant une attention particulière à l'application des pratiques sélectionnées, à l'éducation des patients, prestataires et décideurs, à l'analyse des résultats cliniques et des meilleures pratiques, et enfin, à la mise en place de travaux de recherche collaborative focalisés sur la rentabilité, les nouveaux paradigmes et les modèles de soin.

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## Chapter 1 – INTEGRATIVE HEALTH AND HEALING AS THE NEW HEALTHCARE PARADIGM FOR THE MILITARY

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### **ABSTRACT**

*The field of Integrative Health and Healing is emerging out of the dark recesses of “voodoo” stereotypes and into the light as a new and much needed healthcare paradigm. It is a philosophy of health seeking to restore the patient as the preeminent player in the game of health management, disease prevention, and injury recovery. Integrative Health and Healing is a return to the “self” emphasizing patient responsibility for their health and cooperative partnerships with qualified and competent healthcare providers. It includes a holistic approach merging allopathic medicine with complementary. This article will explore the historical origins of integrative medicine and investigate the future role of complementary alternative medicine within Military systems.*

*Keywords: Complementary and Alternative, Department of Defense, Integrative Health and Healing, Integrative Medicine, Initiative, Paradigm.*

### **1.1 INTRODUCTION**

A consensus is building that our current healthcare system is unsustainable and ineffective. Therefore, new paradigms need to be explored. This article proposes the path to the new frontier of medicine and role of healthcare providers in the delivery of health and healing for the Military forces. It is a journey into the unknown. But is it really into the unknown? This is a challenge to think differently, to think globally both in the context of the global world, but also in the context of a holistic, multi-dimensional approach towards health and healing. The time has come to take the concept of “out-of-the-box thinking” and implement it into practices and programs that will empower, enrich and energize both the practitioners and their clients.

### **1.2 OPERATIONAL DEFINITION OF COMPLEMENTARY AND ALTERNATIVE MEDICINE**

Complementary and Alternative Medicine, also known as CAM, has existed over the past 4,000 years. Our ancient forefathers told us to eat a root for our illnesses. Yarrow and Mallow were some of the earliest recorded roots used (Figure 1-1).



**Figure 1-1: Plant Form: *Achillea Millefolium*.**  
Permission given. © Arthur Haines, Delta Institute of Natural History.  
<https://gobotany.newenglandwild.org/species/achillea/millefolium/>  
Retrieved 9 September 2015.

Approximately 1000 AD roots were considered to be heathen, and were replaced with prayer. Eight hundred years later, the prayer was deemed superstitious; therefore a potion was given. During the 20<sup>th</sup> century, the potion was eventually dubbed snake oil while the pharmaceutical companies refined it into a pill and sold it for every ailment. Hence, medications ruled as “wonder drugs”. Today, it is being realized that these wonder drugs are synthetic, and that roots contain important medicinal properties essential for health. So the public is told to eat the root. It is amazing how the cycle has ended where it started 4,000 years ago [1].

Over the past 60 years, in the pursuit of happiness, society has become a passive pill popping one. In fact, a pill is expected, no demanded, for everything. But recently, there has been a rediscovering of the innate powers of healing. No longer is there a need to entrust our health to the pharmaceutical industry, an industry that has largely contributed to passive participation in personal healthcare. One company after another pushes the “magic pill” for everything that society does not want to experience: pain, sadness, overweight. It is said that the pill will transform us into incredibility good-looking people without us having to do anything. Comedian Ellen DeGeneres pointed out that “we have become so lazy that we don’t even have to swallow the pills because they now dissolve on our tongues” [11]. At what point will society recognize that citizens are no longer participating in their own health, their own well-being and in their own lives?

The National Center for Complementary and Integrative Health (NCCIH), formally known as the National Center for Complementary and Alternative Medicine (NCCAM) once defined CAM as a “group of diverse medical and healthcare practices that are not generally considered to be part of conventional medical.” [21] CAM is everything outside what is typically defined as Western Medicine. At times these boundaries can be blurred and somewhat contentious.

By breaking down the words, the concept of CAM can be better understood. Complementary refers to the use of CAM modalities with conventional medicine. The treatments complement or augment “Western Medicine”. Alternative refers to the use of CAM modalities instead of conventional medicine. This is an “instead of” approach which limits good practices. A new term has since been developed when referring to CAM; that is the term, Integrative Medicine (IM). Integrative medicine uses those CAM modalities, which have some evidence of safety and effectiveness, in combination with conventional medicine. [21] Let’s take it one step further. It is proposed, to replace the word “medicine” in Integrative Medicine with “Health and Healing” for the new term, Integrative Health and Healing (IH2). Using the word “medicine” often leads many to believe that healthcare is still embedded in the pharmaceutical solutions to disease. Besides, shouldn’t the goal of providers be to assist patients to *Heal* in the process of obtaining *Health*?

### **1.3 INTEGRATIVE HEALTH AND HEALING**

One of the core principles of the Integrative Health and Healing model is patient-centered care. Integrative Health and Healing places a shared responsibility for health and healing onto the shoulders of both the patient and provider with the patient taking the lead role. This partnership centers on the patient, which is quite different from the current disease centered model. The patient-centered model allows for individualized treatments based on the goals and needs of the patient. The patient is the driving force of the healthcare system not the disease. As we review IH2 two fundamental questions emerge. One, why is it important and two, what are some of its pitfalls?

So why is it important to consider Integrative Health and Healing model for our healthcare system? In answering that question, the real question becomes, what are the potential problems with the implementation of this model into our healthcare system? First, companies will claim just about anything today under the CAM label. There is huge profit in it. Who doesn’t want to say goodbye to illness. Marketing strategies lead many to believe that illness isn’t natural, old age isn’t natural, but most importantly, drugs are not natural but herbals are. Baby boomers are being sold the much sought after “fountain of youth” and “disease free lives”. What more could be ask for? If only Ponce de Leon knew it was that simple to find the fountain of youth. Did you know our friend the shark can cure our bone pain and a tree can improve our memory and concentration? (Figure 1-2).



**Figure 1-2: Lemon Sharks.** © thediver123. Permission given. License for use purchased. <http://depositphotos.com/portfolio-1009393.html?qview=3121339>. Image ID 1009393.

More impressively, companies advertise that besides curing nearly everything, CAM can put a person into a whole different state. So with 100% cures, the fountain of youth, amazing looks, trim bodies and euphoric lives, CAM offers a lot. But the same claims have been made with conventional medicine. A newspaper ad tells the story of a British tot whose life was saved by Super Glue [9]. Yes, Super Glue, the stuff that glues your fingers together for life. The Super Glue was placed into the brain to “plug” the flow of blood into the skull (Figure 1-3). Sounds very scientific and evidence-based, doesn’t it?



**Figure 1-3: “Super Glue” Plugs Holes in Toddler’s Brain.** Radiograph of Super Glue used for galen malformation. Permission given. Dr. Alejandro Berenstein. Chair, Institute of Neurology and Neurosurgery, Mount Sinai St Luke’s-Roosevelt Hospital, New York City, NY, USA. <http://healthmad.com/medicine/doctor-plugs-babys-brain-with-glue/> Retrieved 10 September 2015.

In fact, some CAM advertising suggests that all of CAM is “natural”. For something to be truly natural it must be integrated with the basics of self-care and responsibility. There must be an attunement to the whole instead of a separation into parts. It is the synergy of the parts that creates a new state unobtainable from just one part. It is like the difference between the sound of a musical instrument and the sound of an orchestra.

## **1.4 LOSING THE DOCTOR/PATIENT RELATIONSHIP**

Today, medicine has become a science of ordering tests to diagnose disease. Conventional Medicine is not meeting patients’ needs. It is becoming a significant cost to society. Healthcare costs are over 17% of the GNP in the United States and expected to rise to nearly 20% by 2024 [7]. Additionally, death due to iatrogenic causes is the third leading cause of death in the United States with nearly 50% of the drug errors and adverse reactions preventable [30], [19], [23], [18].

The field of medicine is evolving because of the patient’s demands. It seems that providers are losing the healer’s art and the patients are letting them know. Some hospitals across the United States have begun to use algorithms to substitute for clinical decision-making. At times treatment decisions are based on a MRI or lab value without a clinical examination of the patient, which can be detrimental to a patient. The doctor/patient relationship is being lost, a relationship that has been shown to be a critical component of healing. Patients want to be treated as a person not as a lab test or disease. So many patients look outside of conventional medicine. Many patients see CAM as natural, safer and more personal. This is a problem. So the medical community must engage the process.

The need to investigate integrative health and healing can be understood by looking at the current prevalence data. According to the National Health Statistics Report, 2002, up to 62% of patients in the USA used CAM treatments in the preceding 12 months [2]. Additionally, patients spend a staggering \$34 billion dollars per year on CAM with an estimated 354 million visits to CAM providers [20]. Further, more patients go to CAM practitioners than to their primary care providers [13]. Why are these trends occurring? Patients are tired of depersonalized treatment. The increase in CAM also stems from the explosion of herbal preparations that manufacturers advertise as effective for nearly every condition. This is troublesome. The medical field has a responsibility to ensure that patients are choosing safe and effective treatment options through proper evaluation and research. There is a duty to study IH2 therapies to ensure effectiveness, safety and a cost benefit for patients. Collaborative partnerships are needed to develop the new model of healthcare.

## **1.5 THE PUSH FOR THE NEW PARADIGM**

Scientists and government health officials are starting to understand why IH2 needs to be studied. The Office of Alternative Medicine (OAM) at the National Institute of Health (NIH) was started in 1993. The very first large, multi-centered trial of CAM therapy was on the effects of St. John’s Wort (*Hypericum perforatum*) for depression. It was a \$4 million project lead by Dr. Jonathan R.T. Davidson, MD, at Duke University Medical Center in partnership with 12 academic facilities. The outcome showed that neither the botanical nor sertraline were significantly different than placebo [17]. This was the start. Since then, OAM now known as National Center for Complementary and Integrative Health (NCCIH) has increased its annual research budget from approximately \$1 million dollars in 1993 to over \$123 million in 2014 [22]. The response of science has been impressive. The number of PubMed citations in CAM has significantly increased over the years at a rate of approximately 25% per year. In response, PubMed (<http://www.ncbi.nlm.nih.gov/pubmed>) developed a separate category specifically for CAM.

Our medical education is being adapted to meet the needs of our future providers. In 1999, Jon Kabat-Zinn, PhD developed the concept of the Consortium of Academic Health Centers for Integrative Medicine [8]. Today, 60 institutions are part of the consortium working towards advancing medical school curricula, establishing standards for integrative medicine research, and integrating alternative treatments into clinical care.

## 1.6 WHAT IS TRULY EVIDENCE-BASED?

There is a struggle within today's healthcare over what is an acceptable "alternative" treatment. But what is that acceptance based on? Is it the assumed understanding that conventional medicine is "evidence-based"? But is conventional medicine always evidence-based? In 2009, within the field of CAM, most of the publication types were either Reviews (23%) or Clinical Trials (20%). Clearly, this is not solid evidence for the acceptance of CAM. When it comes to the gold standard of the Randomized Controlled Trial (RCT), there were only 13% of the publications listed as RCTs. Compared to conventional medicine, when the PubMed key word is "research", there are only 3% of the nearly 450,000 citations listed as RCTs. Not such a good story either. So scientists and researchers have a long way to go with both CAM and conventional medicine research. Therefore, instead of conventional vs. CAM, it is proposed that it should be *proven* vs. *unproven* practices. Isn't that what is really expected? Finally, the need for rigorous evidence-based research for the implementation of a treatment needs to be tempered by the degree of invasiveness and potential harm from that treatment. A simple meditative breathing technique shouldn't require the same level of evidence as that needed for cardiac shunt placement. The breathing technique results in little to no harm to patients. Therefore practitioners can use it at the same time research is conducted. In this case, practitioner's observations can support effectiveness while efficacy can be rigorously studied. Dr. Andrew Weil, MD, refers to this as the "sliding scale of evidence" [31].

No conversation of non-scientifically based treatments would be complete without a discussion regarding the practice of "off label prescriptions". Nearly 75% of pediatric medications are prescribed off-label. This leads you to wonder if our children are not guinea pigs for prescriptions. The *Archives of Internal Medicine* reported that overall 73% of off-label use has little or no scientific support [27]. Therefore, should conventional medicine be blindly accepted as the standard practice because it is assumed to be grounded in evidence-based research? Clearly most of it isn't. Shouldn't the practice of "off label prescriptions" be considered as a CAM treatment because the practice is not the standard? Therefore, should all "indicated use prescriptions" be considered conventional medicine? Don't both need to follow rigorous scientific approaches for best practices? Perhaps what is being witnessed is a double standard of the expectation that CAM modalities must be evidenced-based, when in reality most conventional treatments are not. Thus, again, research has some work to do with respect to translating evidence-based research and implementation into clinical practice.

## 1.7 INTEGRATIVE HEALTH AND HEALING IN THE FEDERAL HEALTHCARE SYSTEM

In 2014, several high-level United States Federal Healthcare offices have included IH2 modalities into their systems. In 2010, The Army Surgeon General released the recommendations of the Task Force on Pain Management. The overall focus of the report was to provide a holistic, multi-disciplinary and multi-modal approach to pain management with the goal of optimal Quality of Life (QoL) for patients with pain. The medical model proposed emphasizes the patient-centered model instead of the disease model in which the patients are active, not passive participants in their care. The use of Integrative Medicine (IM) modalities such as acupuncture, yoga, manual manipulation, medical massage, biofeedback and mind/body therapies were recommended for Tier 1 implementation status. The tiered structure represented a hierarchy of implementation based on current accepted literature supporting efficacy, safety, and widespread use or acceptability [24].

There are other initiatives underway within the U.S. Federal Healthcare System for the inclusion of IH2 modalities. New agencies have been developed to specifically look at IH2 modalities as possible treatments to improve delivery of healthcare as well as the health and well-being of our patients. The National Intrepid Center of Excellence (NICoE) in Bethesda, MD, USA, in partnership with The Defense Centers of Excellence (DCoE) for Psychological Health and Traumatic Brain Injury opened a holistic integrative center for the treatment of Traumatic Brain injured warriors. Another key initiative at The U.S. Army Telemedicine and Advanced Technology Research Center (TATRC) is the development of an Integrative Medicine service that focuses on optimal healing environments, advanced pain management and resilience. The U.S. Veteran Administration (VA) is working on the implementation of the White House Commission for Complementary and Alternative Medicine Policy recommendations. Finally, the U.S. DoD is working with NATO on the first Integrative Medicine Task Force (HFM-195).

So how do Military patients compare to their civilian counterparts regarding CAM? Actually there isn't much difference. Low-Back Pain (LBP) is the most common reason for the use of IH2 for both [29]. Additionally, both populations use a significant amount of herbals and supplements in self-care. The Military population tends to use a higher percentage as performance enhancers and weight loss products. Service Members (SMs) are seeking out performance enhancements to meet the demanding needs of the Military; they are looking for the optimal edge. The 2005 U.S. DoD Survey of Health-Related Behaviors among Military personnel showed up to 63% of Active Duty personnel use herbals or supplements [28]. Additionally many patients will seek treatments at out-of-pocket costs because they feel it works for them and they can't wait for the Military to meet their needs. Within Military systems, health promotion and lifestyle are promoted not as a way of life, but as a necessity of life. SMs in the Military need to be functioning like elite athletes because their jobs demand it.

A comparative study on the availability of CAM at selected U.S. DoD Medical Treatment Facilities (MTFs) was conducted over the time period of 2005 and 2009. The study showed an expansion in the types of CAM services available, the number and type of providers providing those services and a shift in funding from central to facility funded over 2005 to 2009. This survey suggests that leadership understands the value of CAM treatments as evident by the expansion of those services at a cost to their facility budgets [25]. (See, in this report, Petri and Delgado: "Integrative Medicine Experience in the U.S. Department of Defense", pp. 4.1 – 4.10.)

A follow-up survey of over 540 DoD MTFs and Morale, Welfare and Recreation (MWR) services was completed. This survey looked at the prevalence of CAM but also at the leadership's perspective towards CAM and its inclusion in the long-term strategic plan [26].

In January 2014, the United States Defense Health Agency published the report "Integrative Medicine Health System Report to Congress". The report showed 120 (29% of 421) MTFs offer 275 CAM programs. Further, it showed that during the Calendar Year (CY) 2012, Active Duty Military members used 213,515 CAM patient visits. The most frequent visits were chiropractic care (73%) and acupuncture treatments (11%). The most common CAM programs were acupuncture, clinical nutrition and chiropractic care. The overall recommendations of the report were:

- 1) The Military Health System (MHS) will evaluate CAM programs for safety and effectiveness as well as cost-effectiveness; and
- 2) The MHS consider widespread implementation of cost-effective CAM programs meeting guidelines for safety and effectiveness [10].

## 1.8 THE NEW PARADIGM

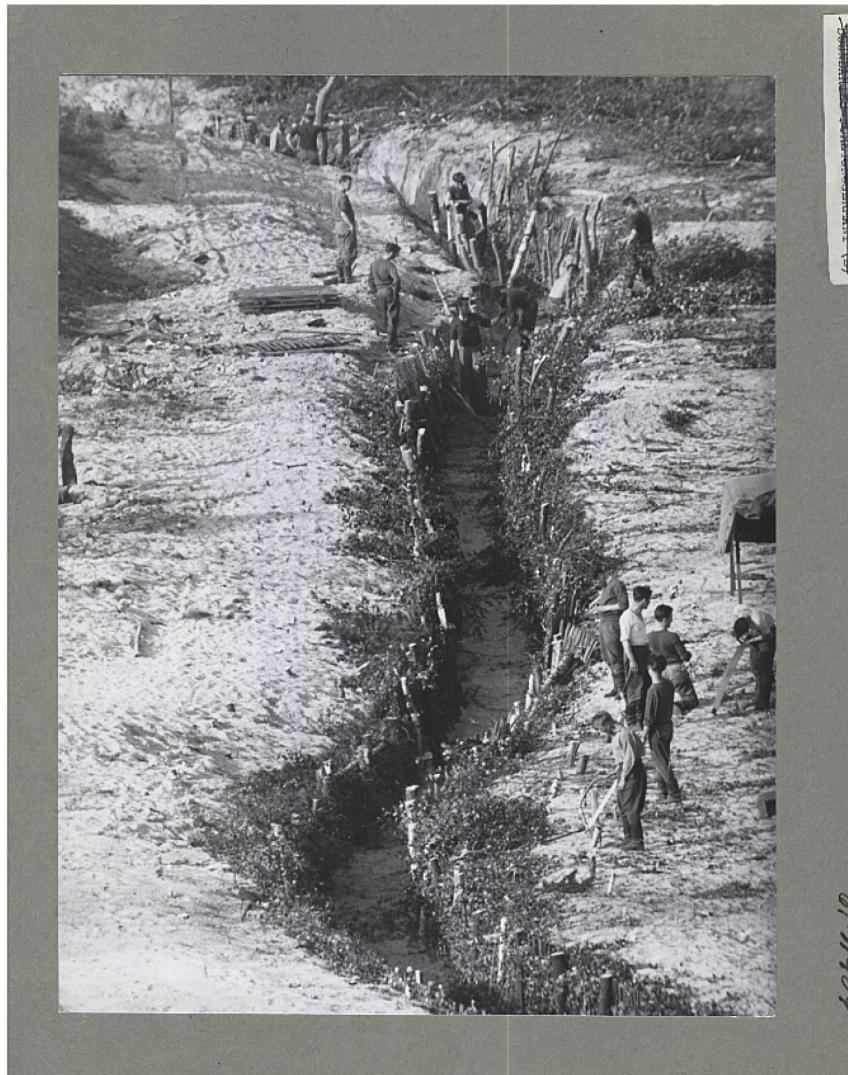
The future of medicine depends upon our ability to listen, adapt and respond in an integrative manner. Simply put, adding Complementary and Alternative Medicine modalities to a regimen of conventional treatments does not make it integrative health and healing nor does it make an Integrative Health and Healing Center. Integrative Health and Healing must emphasize wellness and the healing of the whole individual with their supportive community utilizing all medicine system modalities in a dovetail approach with each other. IH2 leverages all the interactive relationships between treatments, patient, family, providers and staff as well as the subtle, often overlooked experiences of all involved. Integrative Health and Healing (IH2) can represent the new system of care, the paradigm shift from reactive, disease-based medicine to one of health-enhancing, patient-centered care; from reductionism to holism. Hippocrates wrote physicians should seek to “cure sometimes, heal often, comfort always” [15]. Ancient healing practices emphasized the important link between the mind, body and spirit. Only in the Western medical view do we separate these. Hippocrates further wrote “the natural healing force within each of us is the greatest force in getting well” [16].

Integrative Health and Healing modalities are often low-tech, low-cost interventions that incorporate mind, body, spirit, and soul. Recall, our current medical practice is over 17% of our GNP and rising [7]. The annual cost of U.S. Military Healthcare has more than doubled from \$17 to \$35 billion dollars over the period of 2001 through 2007. By 2015, it was expected to nearly double again. This will represent 12% of the U.S. defense budget [14]. Healthcare could jeopardize global Military readiness. Therefore, IH2 could offer a means to decrease the rate of rising medical costs while helping patients help themselves.

Is this paradigm shift evolutionary or a revolutionary return to our roots? It is both. It is evolutionary in the sense that many technologies and procedures have been refined and perfected with time’s passage, but revolutionary in the sense that we are now adopting ideas rooted in the ancient past. It is clear that the current system is not working. Few will disagree with that. So change must occur. The terminology to describe the new paradigm must change as well [4], [3], [6]. The current time is disruptive, disorganized and chaotic, but it represents a tipping point of a new age in medicine. Healthcare solutions require revolutionary thinking. Now is the time to think outside the box and create new ways of dealing with old problems. The past can bring about a new future. This all begins in the mind. IH2 emphasizes the importance of the self: self-improvement, self-empowerment, self-healing, self-awareness, you name the self. It allows our warriors to sharpen their sword and push themselves to the edge. Through self-responsibility, our Service Members become a more self-confident and balanced force, empowered to deal with adversity, both on and off the battlefield.

Progressing to a new model leads to a change in our cultural tapestry. The Military and medical field is rich with culture. Service Members are the current day warriors. The Military represents a brother and sisterhood of focus, discipline, determination, and tenacity, all to serve a greater purpose. The U.S. Army Warrior Ethos is a way of life that applies both to a person’s professional and personnel life. Providers cannot leave our fallen comrades behind medically. Being embedded in the ways of the past will prevent looking towards the future. Innovation requires forward thinking. But there needs to be an openness to change. However, there needs to be caution about openly accepting change for change sake. In 1940, Mount Holyoke College Professor Walter Kotschnig told his students “keep their minds open – but not so open that your brains fall out” [5].

So, how can healthcare return to the basics? The diverse cultures can be leverage to meet the challenges of the future. The lessons from the past must be learned and applied. Mistakes are often repeated in agonizing regularity. In the beginning of WWII, militaries approached the battlefield utilizing the same failed philosophy of WWI. The millions of deaths in WWI should have taught that trench warfare was not an effective strategy. (Figure 1-4).



**Figure 1-4: Berlin, Germany (E): A Ditch, Reminiscent of World War I Trenches, Runs Along the Edge of the “Death Strip” in the Rudow District of East Berlin. The communist evacuated residents and razed buildings in the strip to provide border guards with a clear field of fire at West Germans attempting to escape to freedom in the West. Source: USIS Bad Godesberg/H-38946. U.S. Information Agency 1982-10/1/1999. U.S. Information Agency. Press and Publication Service. Visual Services Branch. Photo Library. 1953 – 1977. (Predecessor). International Communications Agency. Press and Publication Service. Publication Division. 1978 – 1982. (Predecessor). Series: Master File Photographs of U.S. and Foreign Personalities, World Events, and American Economic, Social, and Cultural Life, ca. 1953 – ca. 1994. Unrestricted Use. Courtesy National Archives. Identifier: 6037811 Local Identifier: 306-PS-D-61-11909 Record Group 306. <https://research.archives.gov/id/6037811>.**

Therefore, often the road map to the future is written by the past. During the Vietnam War, Transcendental Meditation was shown to be extremely effective in the treatment of post-traumatic stress disorder. So why is there reluctance to use this technique today? Just how many articles on the front pages of newspapers and as lead story on news broadcasts will it take before a realization that today's treatments are not meeting the needs of our warriors?

Upon the passing through the chaos of change, a calm will emerge from the storm. The right kind of change will bring about exponential progress. As examples, the world has been through the ages of enlightenment, industry, the atom, space and information resulting substantial improvements to the quality of life. Now is the New Age of Mind, Body, Spirit and Soul. Healthcare is at the cusp of transformation. It can begin with the paradigm of the Integrative Health and Healing model. This is a new medicine resurrected from our ancient past. An inscription at the base of a Robert Aitken statue in Washington, DC, USA, reads, "What is past is prologue". Thus, the past is simply the introduction of the future. Therefore, this returning to the basics may not be a return, but rather a following of the blueprint set up by the past. Integrative Health and Healing allows patient, providers and society to return to the art of medicine, the doctor/patient relationship and the emphasis on self-care and responsibility.

Conventional medicine produces disempowered and passive patients stuck in a disease-centered model. It is a deconstructive process that focuses on cellular, organ level pathology instead of the whole person. In sharp contrast, IH2 seeks to understand the whole person's complex interplay of internal and external systems. It represents the critical piece in the healthcare puzzle because it is embedded in the philosophy of holism. It recognizes interconnectedness. Finally the head is being put back onto the body. The natural abilities to heal are an anchor and critical foundation for health. Providers must educate the patient on safe and effective IH2 options and allow them to take the lead in their quest for health and healing.

## 1.9 THE FUTURE

The precipice of change is approaching. Things will appear to be chaotic with deterioration and degradation of what is held as the status quo. It is this tornadic whirl that leads to question, is this right direction? (Figure 1-5).



**Figure 1-5: Tornado in a Glass.** 3-D render of swirling storm in glass of water.  
© grandeduc. Permission given. License for use purchased.  
<http://depositphotos.com/9733380/stock-photo-storm-in-a-glass.html>.  
Image ID 9733380.

The unknown is entered. Think of a lost boat on a calm sea. It moves very little and wanders aimlessly unless someone rocks the boat. So, could the calm sea represent the status quo? Could the boat represent the current practice of medicine and the paradigm shift represents the rocking of the boat? Can the occupants collectively, in a concerted fashion, actually move the boat in a meaningful direction? Jennifer James, PhD, a noted anthropologist once stated, “We are moving so fast that we cannot see the new cultural tapestry we are weaving, we can only see the shredding of our old one.”<sup>1</sup> This scares us.

Albert Einstein stated that the definition of insanity “is doing the same thing over and over and expecting different results” [12]. So what will it take to stop repeating practices that are not working? The reluctance to change comes from a hesitation to move from what has been comfortable to something new. The current chaos could actually be the tipping point before the new world, the new medicine. It could be the storm before the calm.

Both medicine and the Military are steeped in centuries of culture that have served both well. However, it is these very cultures that make it difficult for change to occur. Thus change comes with difficulty and suspicion and can only be achieved with a shift in perspective. Escher’s pictures often give the perspective of two opposite situations happening at the same time? In this style, the David Macdonald’s picture “The Terrace”, illustrates the sense of a floor and balcony at the same time. (Figure 1-6).



**Figure 1-6: Is it a Floor or a Balcony?** In this image there is the illusion that the floor and ceiling floor are same. © THE TERRACE by David Macdonald. Permission given.  
[http://users.skynet.be/fa414202/Cambiguieties/Illusion\\_Site/Cambiguieties\\_David\\_Macdonald\\_Illusions\\_\\_Image\\_\\_Terrace\\_Illusion.html](http://users.skynet.be/fa414202/Cambiguieties/Illusion_Site/Cambiguieties_David_Macdonald_Illusions__Image__Terrace_Illusion.html)  
 Retrieved 10 September 2015.

<sup>1</sup> Personal Communication with Jennifer James, PhD, on 8 June 2015.

Therefore, couldn't "alternative medicine" co-exist with conventional medicine at the same time? Wouldn't that be the concept of Integrative Health and Healing? In order to go forward, change must occur. Change comes from a willingness and inquisitiveness to see the future today. It comes from a vision of what can be. Together the best healthcare system for the best global force can be achieved through partnerships, common goals and most importantly by recognizing the needs of the clients. The disease does not define a patient, but rather the patient is an individual with a condition asking the medical community for opinions and guidance. This is the shift from doctor leader to patient-centered, from organ system to wholeness, from disease to health and healing. Integrative Health and Healing accurately defines and embraces this shift in medicine. The shift begins now; are you ready?

## 1.10 REFERENCES

- [1] Anonymous. Adapted from Short History of Medicine. [Internet]. [www.izquotes.com/quote/297535](http://www.izquotes.com/quote/297535). Retrieved May 5, 2010.
- [2] Barnes, P.M., Powell-Griner, E., McFann, K. and Nahin, R.L. Complementary and Alternative Medicine use among adults: United States, 2002. Advance data from vital and health statistics; No 343. Hyattsville, MD, USA: National Center for Health Statistics. 2004.
- [3] Barrett, B., Marchand, L., Scheder, J., Plane, M.B., Maberry, R., Appelbaum, D., Rakel, D. and Rabago, D. Themes of holism, empowerment, access and legitimacy define complementary, alternative, and integrative medicine in relation to conventional biomedicine. *J Altern Complement Med.* 2003;9(6):937-47.
- [4] Bell, I.R., Caspi, O., Schwartz, G.E., Grant, K.L., Gaudet, T.W., Rychener, D., Maizes, V. and Weil, A. Integrative medicine and systemic outcomes research: issues in the emergence of a new modal for primary health care. *Arch Intern Med.* 2002;162(2):133-40.
- [5] Blytheville Courier News, Professor Tells Students to Open Minds to Truth. (1940 January 27). Page 2, Columns 2 and 3.
- [6] Caspi, O., Sechrest, L., Pitluk, H.C., Marshall, C.L., Bell, I.R. and Nicther, M. On the definition of complementary, alternative, and integrative medicine; societal mega-stereotypes vs. The patients' perspectives. *Altern Ther Health Med.* 2003;9(6):58-62.
- [7] Centers for Medicare and Medicaid Services (CMS), National Health Expenditure Projections 2014-2024 Forecast Summary CMS, Baltimore, MD, USA. [Internet]. <https://www.ems.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/Proj2014.pdf>. Retrieved 12 September 2015.
- [8] Consortium of Academic Health Centers for Integrative Medicine. [Internet]. <https://www.imconsortium.org/about/history.cfm>. Retrieved February 2, 2015.
- [9] Davies, M. The baby saved by a blob of superglue: Surgeons plug hole in newborn's brain to relieve pressure caused by deadly condition. Dailymail.com. [Internet]. <http://www.dailymail.co.uk>. Published November 18, 2014. Retrieved April 4, 2015.
- [10] Defense Health Agency. (2014) Integrative Medicine in the Military Health System Report to Congress (DHA) Washington, DC, USA: DHA. [Internet]. <http://health.mil/Reference-Center/Reports?ouerv=integrative+medicine>. Retrieved November 30, 2014.

- [11] DeGeneres, E. Ellen DeGeneres: Here and Now. HBO, 25 June 2003.
- [12] Einstein, A. [Internet]. [http://www.brainyquote.com/quotes/authors/a/albert\\_einstein.html](http://www.brainyquote.com/quotes/authors/a/albert_einstein.html). Retrieved 18 November 2014.
- [13] Eisenberg, D.M., Kessler, R.C. and Foster, C. Unconventional medicine in the United States: prevalence, costs and patterns of use. *N Engl J Med.* 1993;328:246-52.
- [14] Government Accountability Office. (2007). Report to Congressional Committees Military Health Care: TRICARE Cost-sharing Proposals Would Help Offset Increasing Health Care Spending but projected Savings are Likely Overestimated (GAO-07-647) Washington, DC, USA: GAO. [Internet]. [www.gao.gov/cgi-bin/getrpt?GAO-07-647](http://www.gao.gov/cgi-bin/getrpt?GAO-07-647). Retrieved November 30, 2014.
- [15] Hippocrates. [Internet]. <http://www.brainyquote.com/quotes/authors/h/hippocrates.html>. Retrieved 28 December 2014.
- [16] Hippocrates. [Internet]. <http://www.quotationspage.com/quotes/Hippocrates/>. Retrieved 28 December 2014.
- [17] Hypericum Depression Trial Study Group, Effect of Hypericum perforatum (St John's Wort) in major depressive disorder: a randomized controlled trial. *JAMA.* 2002;287(14):1807-14.
- [18] Kohn, L., Corrigan, J. and Donaldson, M. eds. *To Err is Human Building a Safer Health System.* Washington, DC, USA. National Academies Press, Committee on Quality of Health Care in America, Institute of Medicine; 2000.
- [19] Lazarou, J., Pomeranz, B. and Corey, P. Incidence of adverse drug reactions in hospitalized patients. *JAMA.* 1998;279:1200-1205.
- [20] Nahin, R.L., Barnes, P.M., Stussman, B.A. and Bloom, B. Costs of Complementary and Alternative Medicine (CAM) and Frequency of Visits to CAM Practitioners: United States, 2007. National Center for Health Statistics. National Health statistics reports; No 18. Hyattsville, MD, USA; National Center for Health Statistics. 2009.
- [21] National Center for Complementary and Alternative Medicine. Complementary, Alternative, or Integrative Health: What's In A Name? [Internet]. Publication No. D347. Online document at: <https://nccih.nih.gov/health/integrative-health>. Retrieved September 12, 2015.
- [22] National Center for Complementary and Integrative Health. [Internet]. <https://nccih.nih.gov/about/ataglance>. Retrieved January 27, 2015.
- [23] Null, G., Dean, C., Feldman, M., Rasio, D. and Smith, D. Death by Medicine. [Internet]. [www.webdc.com/pdfs/deathbymedicine.pdf](http://www.webdc.com/pdfs/deathbymedicine.pdf). Retrieved August 16, 2010.
- [24] Office of The Army Surgeon General. Pain Management Task Force Final Report May 2010. [Internet]. [www.regenesisbio.com/pdfs/journal/Pain\\_Management\\_Task\\_Force\\_Report.pdf](http://www.regenesisbio.com/pdfs/journal/Pain_Management_Task_Force_Report.pdf) Retrieved August 15, 2010.
- [25] Petri, R. and Delgado, R. Integrative Medicine experience in the United States Department of Defense. *Medical Acupuncture.* 2015;27(5):328-34.

- [26] Petri, R., Welton, R. and Delgado, R. Survey of Complementary and Alternative Medicine Services within the Department of Defense (submission pending).
- [27] Radley, D., Finkelstein, S. and Stafford, R. Off-label Prescribing Among Office-Based Physicians Arch Intern Med. 2006;166(9):1021-6.
- [28] Research Triangle Institute International. (2005). Department of Defense Survey of Health Related Behaviors among Active Duty Military Personnel A Component of the Defense Lifestyle Assessment Program. Research Triangle Park, NC, USA: Research Triangle Institute.
- [29] Sherman, K.J., Cherkin, D.C., Connelly, M.T., Erro, J., Savetsky, J.B., Davis, R.B and Eisenberg, D.M. Complementary and alternative medical therapies for chronic low back pain: What treatments are patients willing to try? BMC Complement Altern Med. 2004;4:9.
- [30] Starfield, B. Is US Health Really the Best in the World? JAMA. 2000;284(4):483-485.
- [31] Weil, A. The Advantages of Integrative Medicine. [Internet]. [www.drweil.com/drw/u/VDR00016/The-Advantages-of-Integrative-Medicine.html](http://www.drweil.com/drw/u/VDR00016/The-Advantages-of-Integrative-Medicine.html). Retrieved December 8, 2014.

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## Chapter 2 – HISTORICAL AND CULTURAL PERSPECTIVES OF INTEGRATIVE MEDICINE

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### **ABSTRACT**

*The field of medicine dates back to ancient times. Early practices were adopted by subsequent societies. Cultures had significant influences over many aspects of life. Globally, there is a healthcare crisis of inadequate delivery and less-than-optimal outcomes despite all the advancements and evidence provided by modern biomedicine. NATO Nations represent diverse cultures and societal experiences and, collectively, may offer new perspectives in the evolution of healthcare delivery. A retrospective review of the influences of ancient practices and cultures is provided. This can serve as a foundation for a prospective discussion about integrating the various current systems into a better paradigm of healthcare. This article discusses the impact of historical and cultural perspectives on medicine in general and on specifically Integrative Medicine (IM). The origins of some IM modalities are highlighted. History reveals that new medical paradigms were a blending of old traditions with new innovations. Changes occurred because society questioned old methods. Today the situation is not different. The field of IM is evolving as a result.*

*Keywords: Complementary and Alternative, Culture, Historical Perspective, Integrative Medicine, Society.*

### **2.1 INTRODUCTION**

A bureaucracy is often a barrier to an institution's adherence to its original mission and purpose. Today's healthcare system seems to have fallen victim to its systems of management, thereby diluting the intended goal of caring for patients. Patients are responding to a perceived system of depersonalized algorithmic care and limited contact with providers. This is a system in which technology has often replaced human interaction.

Thus, patients have sought new means of healthcare to meet their needs, expectations, beliefs, and values. Patients in Military populations have done the same as civilian patients [22], [7], [17], [35], [30], [8].

Healthcare systems are deeply embedded in civilization's economic, religious, and societal cultures. Historical accounts are often passed down, thus permitting infusion of previous systems to be adopted into current systems. However, this adoption occurs often with reluctance. Furthermore, it must be remembered that historical accounts are only related stories from personal perspectives. A perspective can often be clouded by an agenda. Nonetheless, history is the binding factor. Historical accounts document the transition from the past to the future.

Globally, there is a healthcare crisis of inadequate delivery and less-than-optimal outcomes despite all the advancements and evidence of modern biomedicine. Thus, a retrospective review of the influences of ancient practices and cultures is necessary. This article can serve as a foundation for a prospective discussion on integrating the various current systems into a better paradigm of healthcare.

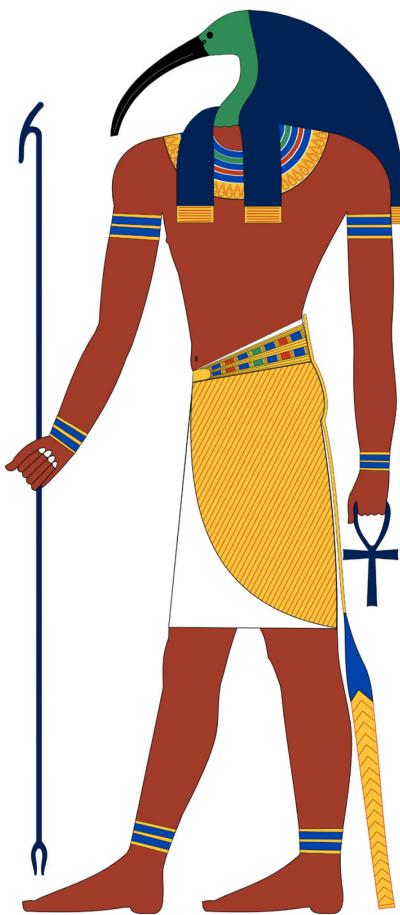
## **2.2 HISTORICAL PERSPECTIVES**

The origins of medicine are deeply rooted in a civilization's culture and religious beliefs. Often, educated priests practiced medicine. Early medicine dealt with experiences, observations, and reflections of the self and one's surroundings. There was no separation of mind and body. In the 1600's, Rene Descartes, in an attempt to protect the spirit from science, separated the mind from the body [2]. This set the stage for the current state of the Western-style mind/body split and evidence-based medicine versus non-conventional or complementary medicine. This was the beginning of the reductionistic movement with the goal of understanding the parts to gain a larger understanding of the whole. Only within the past few decades, has there been an attempt to reunite the medical systems of curing (technological, microscopic, and disease-based) with healing (non-physical, holistic, and relationship-based). The following is a brief history of important and relevant world cultures that have contributed to the field of medicine, conventionally and unconventionally.

## **2.3 THE PERIODS**

### **2.3.1 Mesopotamia and Egypt: 3100 BC**

It is believed that the oldest civilizations were in the areas of present-day Egypt and Iraq (Mesopotamia). Given that medicine is so often culturally based, it undoubtedly follows that the first medicine came from these civilizations. *Thoth* (Figure 2-1) was an Egyptian god who was the inventor of art in general.



**Figure 2-1: Thoth, Ancient Egyptian God Often Depicted as an Ibis-Headed Man. Based on New Kingdom tomb painting. By Jeff Dahl (Own Work). Licensed under Creative Commons.**

He is believed to have been the author of the oldest Egyptian medical work with the contents engraved upon pillars of stone. His words formed a part of the *Hermetic Books* used by the physicians of the day [1]. Interestingly, Egyptian medicine was divided into two degrees. The Science of higher degree consisted of conjurations, dissolving the charms of gods by prayer, and interpretations of revelations received by the sick person during incubations in temples. The highest class of priest performed as the physicians of the higher Science. The Science of the lower degree was “ordinary medical practice” and was practiced by the lowest grade of priests. They studied anatomy, pathology, pharmacology, ophthalmology, and gynecology. It is interesting, therefore, that the higher order of Science dealt with areas, which today some have called “Voodoo” medicine.

The Egyptians developed a system of specialties described as “physicians in Egypt for each part of the body”. [1] In fact, there were priestly physicians who followed the Army and were employed by the state. In *Outlines of the History of Medicine and the Medical Profession*, it is stated, “this specialism is per se an evidence of a civilization of high development, indeed of one tending towards its downfall, and in Egypt it attained a perfection which our own system, with all its completeness, has not yet reached” [1]. Current day Western biomedicine continues to pursue scientific inquiry with specialization and microscopic divisions. Thus, could our system of intense specialization be a portent of our healthcare system’s downfall if it is continued without deviation?

Aromatherapy began in ancient Egypt. The Egyptians excelled in the use of oils, salts, alabasters, and creams for all kinds of diseases and for preservation of the dead [25]. Nefertum was the god of perfumes, incense, and fragrant oils. His mother, Sekmer, was the goddess of healing and alchemical distillation. The use of fragrance was the means of communication between the gods and humanity, offering health to the living and assisting the dead in the next life [13].

The Egyptians believed that the body could heal itself and used reflexology to restore balance and the natural equilibrium [25].

### 2.3.2 India: 2500 BC

Unlike many civilizations that imported systems of other outside cultures, Indian medicine was derived in India and had interwoven systems of other cultures, predominately Greek, as part of India's own system, but this interweaving occurred only at a later time period [1].

The ancient Indians wrote about medicine in their sacred books, known as the Vedas (Figure 2-2).



**Figure 2-2: The Recording of the Vedas in Ancient India.** This is the front cover of the book "The Nectar of Instruction 1<sup>st</sup> edition" by A.C. Bhaktivedanta Swami, Founder of the International Society of Krishna Consciousness. Artwork reprinted with permission from The Bhaktivedanta Book Trust International, Inc.

The Vedas are believed to be of divine origin and were passed down through oral traditions until the sixteenth century AD. One of the Vedas, the *Atharvaveda*, is a collection of spells, hymns, and incantations for magical curing of diseases, and is thought to have been the origin of the traditional Indian medicine system known as Ayurveda [1]. Ayurveda is based on the concepts of longevity and the nourishment of life [37]. Later commentaries on the Vedas, known as the *Brahmanas* and the *Upanishads*, explained these texts and speculated about the nature of the universe as well as the human condition [21].

*Yoga* – A term derived from the Sanskrit word *yug* – was a theological practice that was believed to lead to the unification of self with the Divine. Yoga's origins are believed to date back to pre-Vedic traditions. Yoga is a practice that was considered to be given directly from God. The foundation is based on the suppression of all activities so that one can identify and separate the self from the body, mind, and will. In doing so, one attains spiritual liberation [25]. Yoga, when practiced in the true Indian tradition, is more than a physical exercise program. It has a meditative and spiritual core, and offers a meaningful purpose for life and living.

Buddhism originated in India in the sixth century BC under the teachings of the Buddha. These teachings were in protest of the strict stratification of the Hindu society as well as the religious control of the Brahmanic priests. Buddha emphasized universal love, service, and peace of mind brought about through abandonment of desire [21].

Unani medicine, a lesser-known India medicine sub-type, is based on the theory of the Four Elements of the human body (i.e., Fire, Water, Earth and Air). Different fluids represent these elements. When the fluids are balanced, there is health; when the fluids are imbalanced there is illness [28].

An esoteric form of alternative medicine described in Indian literature is the healing practice of Uropathy. This is a method of healing with the use of one's own urine. It is referred to as *Shivambu* or "holy liquid". In the Tantrik Yoga culture, it is termed *Amroli*. *Amroli* is derived from the word *Amar*, which means undying. Hence, *Amroli* was a spiritual practice that was beneficial to the mind, body, and spirit for the attainment of immortality [31]. It is believed that hundreds of ailments can be cured by urine therapy [33]. Uropathy is not widely practiced today; however, there are World Congresses on the subject, and numerous books and articles on this topic.

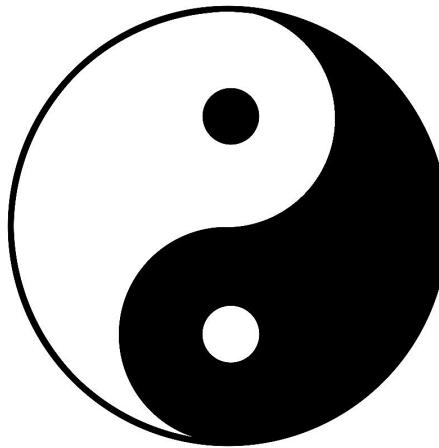
Finally, Indian medicine was weakest in the area of anatomy because of a prohibition against living people having physical contact with dead people.

### 2.3.3 China: 1600 BC

It is widely believed that Traditional Chinese Medicine (TCM) has a 3000 – 4000-year history. TCM was embedded in the "philosophy of Confucius who called for the ideal family ties and the promotion of social and ethical standards of societies." [25] The oldest Chinese medical texts are thought to be on herbal medicine. The Yellow Emperor, Huang Di, wrote about acupuncture, the concept of Yin and Yang, and the Five Phases in his book, *The Yellow Emperor's Inner Classic (Huang Di Nei Jing)* [5].

TCM spread across Asia throughout the centuries and came eventually into the Western world in the sixteenth to the twentieth centuries AD. However, only fragments of TCM are practiced in the West. Nonetheless, TCM has influenced the delivery of Western-style healthcare. Likewise, TCM has not remained stagnant in practice either. Concepts have come and gone and returned over time, depending on current societal perspectives and political environments. Unlike the West, in which an incomplete theory or unacceptable concept is rejected and then disappears, TCM may reject a theory but it does not disappear. It may fade in practice, but it continues to exist and may return at a later time. In the West, it is often thought that something is "either this or that". However,

in TCM, opposing theories can exist. An example of this is the concept of Yin and Yang. Although Yin and Yang oppose each other, they are also complementary to each other (Figure 2-3) [5].



**Figure 2-3: Yin Yang Symbol.** By Donkey-Hotey (Own Work).  
Licensed under Creative Commons (CCBY).

TCM is the overreaching umbrella for many disciplines. Acupuncture is one of those disciplines. The mythological basis of acupuncture suggests that the Chinese speared human bodies to rid towns and villages of demons and evil spirits. Acupuncture evolved over time. The practice of acupuncture was influenced significantly by the reorganized text of the *Yellow Emperor's Inner Classic* and other earlier texts into the text *Systematic Text of Acupuncture* (and Moxibustion) circa the third century CE [5].

TCM was primarily a system for the Chinese elite rather than for the population of the entire nation. Much of the country's population was illiterate, and, as such, little is known about the population. It is believed that the illiterate people's traditions were based on folk superstitions, legends, and survival [5].

The true history of acupuncture may never be known. Despite the fact that classical texts on acupuncture exist, these texts often do not describe the clinical practices. The theories and concepts of Chinese acupuncture do not always translate well and, therefore, the meaning and significance of both have been lost.

Throughout history, TCM and acupuncture have been subject to religious, cultural, and political pressures. During the late nineteenth and early twentieth centuries TCM was politically under attack to make way for a new and more modern China. In 1822, acupuncture was banned from the Imperial Medical Academy after nearly 1200 years of basic Imperial medical education [27]. There was a significant movement to move toward scientifically based medicine. Many of the scientifically trained physicians were concentrated in only three major cities, leaving voids in the other urban and in all rural areas. Thus, the ban undercut the healthcare system of the common people, because much of their care was solely based on TCM.

Only after 1954 did acupuncture become reinvented. Chairman Mao ordered all Western medicine practitioners to study acupuncture. This resulted in organization of the TCM practitioners to provide healthcare. However, it is not clear if this new acupuncture actually resembled the true acupuncture of the millennia before.

Other TCM practices include movement of invisible energies (*Feng Shui*), dietary/herbal therapies ("we are what we eat"), and kinesiology (T'ai Chi, Qigong). This system of exercise was known as the "Frolics of Five

Animals.” [14] Similar to Indian medicine, TCM supports the holistic view of treating the mind, body, and spirit and the individual’s experience of the disease [25].

TCM has been practiced in the United States since the mid nineteenth century. Bache was the first American physician to use acupuncture in his practice (in 1826). In 1901, Ah Fong Chuck was the first licensed practitioner of TCM. Acupuncture gained greater popularity after James Reston, a reporter for *The New York Times*, underwent an emergency appendectomy while he was in China with former President Richard Nixon in 1971 [4].

### 2.3.4 Greece: 800 BC

The ancient traditions of Greece have provided the foundations of Western philosophy, science, and medicine [20]. However, history shows that the Greeks went to Egypt for their medical training. Greek medicine was comprised of magic and legendary beliefs. Like what occurred in preceding cultures, Greek medicine was strongly embedded with priests, seers, and god figures. Apollo, the most powerful god-physician, would cause epidemics as punishments. Yet, he would also revive and heal wounded people [20].

Pythagoras, well-known for his mathematical formulas, was the first Greek philosopher interested in medicine. Mathematics influenced the concept of opposite quantities. The balancing of these opposites was important to health and disease [20].

Hippocrates (Figure 2-4) is considered to be the father of Western medicine. He established “medicine as an art, science and a profession of profound value and dignity.” [20] Medicine was no longer a part of philosophy [9].



**Figure 2-4: Hippocrates: Medicine Becomes a Science. Permission given. Collection of the University of Michigan Health System, Gift of Pfizer, Inc., UMHS.7.**

The life of Hippocrates is not well documented, and it is argued by some scholars that Hippocrates was not an individual person. Nonetheless, he is credited with the theory of the Four Humors to mirror the earth's four elements [25]. These humors, with their associated qualities (hot, cold, moist, and dry), formed the human microcosm, which was reflective of the larger universal macrocosm. Health was achieved through a balance and blending of the humors. Hippocrates believed that dietetics was the basis for the art of healing. Thus, food could be used to achieve health and healing [20].

Current standard herbal textbooks are based on the herbal medicine book written by the Greek physician Dioscorides (Cited by Oumeish) [25]. The term medica comes from the Greek mythological story of Medea, sorcerer of the seventh century and the land Media. Media is the area of current North-Western Iran and South-Western Turkey. The plants of Media were known as "median herbs" and their ointments, medicamentum, the root for our current term medications, could be used to heal or poison. This implied that medications could be used for healing or harming [2].

### 2.3.5 Rome: 27 BC

In the early days of Christianity, the system of medicine had a strong overlay of mysticism (Figure 2-5). The Christians believed that disease was the result of sinful behaviors and cure was achieved through grace or suffering. Often, the ability to touch a "holy relic" was a promise of healing. Some of the relics noted to have these healing properties included the "finger of the Holy Ghost", rays of the Star which led the Wise Men to the birthplace of "Jesus", and a rib of the Word made "flesh". [6]



**Figure 2-5: The Flammarion Engraving** is a *Wood Engraving* by an Unknown Artist that First Appeared in Camille Flammarion's *L'atmosphère: Météorologie populaire* (1888). The image depicts a man crawling under the edge of the sky, depicted as if it were a solid hemisphere, to look at the mysterious *Empyrean* beyond. The caption translates to "A medieval missionary tells that he has found the point where heaven and Earth meet ..." By unknown artist. Source: Wikimedia.org.

Much of Roman medicine was adapted from the Greeks. The Romans improved aromatherapy with their spas, saunas, and baths [25]. Roman medicine was greatly influenced by the work of the prominent physician Galen. It was believed that imbalance in the four humors led to diseases, a belief that was originated by Hippocrates. After Galen's death, medicine in Rome began to stagnate. There was distrust in the system, which is now considered to be greedy, incompetent, and dishonest. The public sought new means of treatment from their own gardens, a principle known as *Euporista*. Books on the subject began to replace physicians. It was believed that nature provided remedies. In the late Roman period, individuals could practice medicine without training. Organized medicine was replaced by supernatural principles and home remedies [26]. Public beliefs overran scientific principles.

### 2.3.6 Islamic Golden Age: 622 AD

During the Islamic Golden Age, Persian physicians contributed to medicine in two phases. The first was a period of translations (750 – 900 BC). The philosophers, Gerber (721 BC), Al-Kindi (801 BC), Rhazes (865 BC), (Figure 2-6), Al-Farabi (872 BC), Avicenna (980 BC), and Averroës (1126 AD) had profound effect on the Dark Ages of Europe. The Dark Ages comprised a period of time when there was little advancement in the field of medicine.



**Figure 2-6: Muhammed ibn Zakariya al-Razi. Also known as Razis or Rhazes. Persian philosopher and physician. This is a faithful photographic reproduction of a two-dimensional, public domain work of art. Source: Wikimedia.org.**

The previous civilizations' medical knowledge, especially the Greek knowledge, was preserved, which enabled its passage to Europe upon that region's emergence from the Dark Ages period [6]. Moir, a Scottish physician states that "medicine is incalculably indebted to the Saracens" [a generic term for Muslim during the later Medieval era]; "for the preservation of the Greek writers; as it was only after the return of the French, Italian and English from the Crusades that these came to be known in Europe, through translations from the Arabic." [24]

The second period was a period of observations and expansion (900 – 1100 BC). During the time of Mohammed, the culture promoted learning, arts, and sciences for intellectual development. The region established

great medical colleges with strict admission guidelines. The schools followed rigorous scientific principles, and understood the use of anesthetics and hygiene. Their ancient *materia medica* rivals that of Western medical textbooks today [24].

Arabic medicine was practiced within the context of Islam's system of ethnics. It became known as Prophetic Medicine. It was believed that true medical knowledge came from revelations from the Prophet [26]. It was supernatural, and esoteric, and filled with unconventional imagery; however, this medicine suited the majority of the people, was inexpensive, and was widely accepted. Arabic medicine was linked to philosophy and tied to numerical and astrological symbolism. Magicoreligious thoughts had significant influences on the system. Some of the practices included fortune telling, exorcisms, inspirations, amulets, healing gems and crystals, charms and spells, and cupping. The physician stressed treating the early symptoms by unconventional means to expose disease early treatable stages. These physicians often used herbals for such treatments [25].

Although the Arabic physicians copied much from other civilizations, these physicians did expand their knowledge of medicine. They divided medicine into three distinct professions: physic, pharmacy and surgery. In the areas of aromatics and purgatives, Arabic physicians added their knowledge to botanical and *materia medicas* extensively. Rhazes wrote the first treatise on the diseases of children. The Arabs raised the dignity of the medical profession from one of a menial calling to a learned profession with examinations and licensing [9], [19].

### 2.3.7 The Renaissance to the Modern Era

The emergence of the Dark Ages into that of the Renaissance was largely the result of the Arabic period of translation. The ancient works were brought forward to the modern era through translation into the common language of the time: Latin. This was followed by an expansion in experimental investigation, particularly in dissection of the human body. As a result, human anatomy and neurology had significant advancements. Famous theories and principles were criticized and often debunked. Science began to replace mysticism. New publications spurred excitement and interest. Anatomical dissection theaters flourished, attracting artists, students, and scientists. University medical training began in Salerno and then later in Padua and Bologna, Italy, followed by France and England. Although, this training was primarily academic it had little clinical experience as part of the training. Medicine began its descriptive phase [29].

During the next several centuries, medicine expanded in its scientific knowledge base exponentially. Technological advances contributed and enabled a deeper range of observations, interactions, and interventions. Generalities became specific. Specialization occurred at an unprecedented rate and to the point that there was sub-specialization for treating minute portions of organ systems. As such, medicine became compartmentalized with some people stating that medicine had become depersonalized as well.

This trend was advanced and complemented by economic, political, and Military powers of the times. Powerful cultures colonized older, less-powerful cultures, so that Western medicine became global.

### 2.3.8 Shamans, Medicine Men<sup>1</sup> and Cuaranderos

The term *shaman* comes from the Tungas language of Central Siberia. A shaman is an individual who enters altered states of consciousness in order to acquire knowledge, power and to help others [12]. Shamans use drums to call upon spirit allies [23]. The repetitive sound of the drum facilitates the trance states in shamanistic practices. These drums are likened to a canoe or horse that transports the shaman into "the Lowerworld or

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<sup>1</sup> In many shamanistic traditions, the shamans are typically men rather than men and women.

Upperworld” [11]. Shamanism cannot be learned, but rather, shamans are born into the life [23]. This calling is that of a healer. Shamanism represents “the most widespread and ancient methodological system of healing known to humanity.” [11]

During the practice of shamanism, both the shaman and the patient travel on the journey together. There is a deep level connectedness between the two; something that is often lacking in today’s doctor/patient relationship. Despite the significant differences in the cultures and the separation by distances, shamanistic practices across the world are similar. Thus, “the basic uniformity of shamanic methods suggests that, through trial and error, people arrived at the same conclusions [10]. In many regions of the world, the shaman is seen as “the great specialist of the human soul: he alone ‘sees’ it, for he knows its ‘form’ and its destiny.” [3] Names such as witch, magic man, witchdoctor, seer, sorcerer and medicine man have been used interchangeably for shaman [12].

Shamanistic practices are very prevalent in traditional American Indians practices of today. These shamans are often known as *medicine men*. Most of the pre-Columbian practices were not recorded or did not survive. The early European settlers provided the earliest accounts. Native Americans were not a homogenous population and as such neither were their practices. However, a common thread of the medicine men was that all aspects of life were intimately connected to good health and well-being. Life was a circle and the healing included all aspects of an individual’s life, family and community. The medicine man practiced a highly advanced medicine that was effective in combating disease common to their day. Some of the widely used herbal-based treatments included echinacea (*Echinacea spp.*), ephedrine (*Ephedraceae spp.*) and cacao (*Theobroma cacao*), which are widely used in contemporary medicine and society [34].

Cacao was cultivated in the Mesoamerican region (current day central Mexico) dating back to 1900 BC. Cacao was so revered that “all subjects in service to the Aztec emperor were required to bring several bags of cacao in tribute.” [18] The Aztecs mixed cacao with other ingredients such as chilli (*Capsicum annum*), black pepper (*Piper nigrum*), cornmeal or plantains to make the traditional drink *chocolatl*. Sugar was not added until 1528, when Columbus introduced cacao to the Spaniards. Cacao was used for a multitude of illnesses (weight gain, invigoration of the nervous system of the apathetic, exhausted or weak, improvement of digestion and bowel function and stimulation of kidney) as well as a flavoring for other medicine, especially those for children. In addition to the cacao bean, the leaves, flowers, bark and oil had medicinal properties that were used to treat burns, cuts and skin irritations [18].

The term *curanderismo* describes a broad healing tradition of Latin America. The word is derived from the Spanish verb *curar*, which means, “to heal”. There are seven pillars or cultural and historical roots of Curanderismo. These represent the blending of ancient civilizations with the native population of Latin America. The construct of Curanderismo is based on the duality of natural and supernatural causes. Natural causes can be treated with herbal remedies, whereas the supernatural causes require treatment only by the supernatural manipulations performed by curanderos. Supernatural causes of illness are due to either “espiritos malos” (evil spirits) or “brujos”. Brujos are individuals that practice malign magic. The supernatural manipulations consist of several types of rituals such as sweeping, incensing or conjuring, which lead to removal of negative forces. Curanderismo practices often provide better healing for chronic mental health conditions as well as alcohol and drug addiction than that of Western psychiatry and psychology [32].

The healing practices of curanderos are culturally meaningful to their society. This is a must for any healthcare system to be effective. Additionally, Curanderismo blends worldwide healing traditions, ancient and contemporary, for a true integration of different approaches [32]. Thus, lessons should be learned as the new paradigm of Integrative Medicine is developed.

## 2.4 DISCUSSION

Prior cultures have shaped the present day to form the foundation of the future. Societies' cultures are influenced by the religious and political classes of the time. The healthcare of a given time period is a reflection of those influences. Thus, the struggles of the present evolution in healthcare is not unlike past turmoil, power grasps, and reluctance to "let go of the status quo". Of all the great societies, only the Indian and Chinese medical systems have endured as healthcare systems. In addition, it is not clear how well history has recorded the true philosophies of each.

Today, priests and clerics do not control healthcare, unlike much of the ancient times. In fact, it is often not permitted. The incorporation of religious practices within Military cultures is often met with skepticism and resistance. However, it seems that spirituality is more acceptable. The Human Performance Resource Center (HPRC), a U.S. Department of Defense initiative under the Force Health Protection and Readiness (FHP) Program developed the Total Force Fitness (TFF) program. It is a framework for building and maintaining health, readiness, and performance. The TFF program views health, wellness, and resilience as a holistic concept wherein optimal performance requires connections among mind, body, spirit, and family/social relationships. Information about the TFF program was published in a special issue of *Military Medicine* [16] with a chapter devoted to solely to spiritual fitness [15]. In addition, there is a chapter within this current North Atlantic Treaty Organization (NATO) Special Issue of *Medical Acupuncture* describing a systematic review of spirituality/religiosity, and what context this can be applied to Soldiers in the course of healing (see, in this report, Büsing: "Spirituality/Religiosity as a Resource for Coping in Soldiers: A Summary Report", pp. 8.1 – 8.11).

Regarding an area related to this concept, there is current controversy regarding implementing yoga into some Military healthcare systems because "it represents a religion". Although yoga has a religious foundation, "Western-style" yoga is no more a religious practice than many fitness classes, (Pilates, zumba, aerobics) offered at most gyms. When yoga is practiced in the true Indian tradition this yoga is more concerned with spirituality than with religiosity.

Thus, utilization of religious practices as part of healthcare systems is not acceptable; however, it seems that spirituality may be a necessary component of an individual's healing journey.

Politics has played an enormous role in shaping healthcare in the past. Today, this situation is not different. Current debates regarding acupuncture are similar to those nearly 2 centuries ago. Most recently, in 1928, The China's National Health Council issued a resolution banning acupuncture. It is interesting how the tone of the resolution is similar to the arguments used in opposition to IM today. In the *Resolution for Abolishing the Native Practice Proposal*, it is stated:

*The medicine of today has advanced from the curative to the preventive stage, individual to collective medicine, personal to community emphasis. Modern public health service is based entirely on scientific medical knowledge with the corresponding political backing. The old-style medicine of China adopts the doctrines which are pure speculations having not a grain of truth. The diagnosis depends wholly on the signs of the pulse. Such absurd theories are deceptive to one self [sic] and to others. They may be classified in the same category as astrology. Since fundamentally they do not know diagnosis, it is impossible for them to certify the causes of death, classify diseases, combat epidemics. The evolution of civilization is from the supernatural to the human, from the philosophical to the practical. Now while the Government is trying to combat superstition and abolish idols so as to bring the people's thoughts to proper scientific channels, the old-style physicians, on the other hand, are daily deceiving the masses with their faith healing. While the Government is educating the public as to the benefits of cleanliness*

*and disinfection and the fact that germs are the root of most diseases, the old-style physicians are broadcasting such theories as when one catches cold in winter, typhoid will appear in spring; when one suffers from the heat in summer, malaria will come in autumn. These reactionary thoughts are the greatest hindrance to scientific progress (Cited by Wong and Wu) [36].*

Thus today, with improved research techniques and acceptance of new/old methods, IM modalities, such as acupuncture, meditation, and yoga, to list only a few, are being investigated and incorporated in global healthcare systems.

## 2.5 CONCLUSIONS

Culture is complex and multi-factorial. It influences all aspects of society. Likewise, the society influences all aspects of culture. However, too often, culture has been shaped/decided by the powerful classes of their times. This applied to the field of medicine as well. Only over the past several decades, has there a renewed grassroots effort to change the course of medicine. Society is affecting the rule of the “deciding” class. There is a push to diminish the role of technology in patient care and return medicine to a more humanistic approach to healing and health. However, this movement is nothing new. It has been repeated many times since ancient cultures. As with all things, paradigms evolve, resulting in changes in philosophy, terminology, and policy. Therefore, as understood by history, more changes will come. Thus the culture, with its impact on the present as well as the future, will be defined.

## 2.6 RECOMMENDATIONS

Medical healthcare systems of the world are constantly changing. They must do so. As such, it is imperative to study the cultures and societies that laid the foundations of medicine in the past. Lessons can be learned and mistakes can be avoided. However, the greatest advantage that history provides is the ability to take knowledge from the past and weave it into today’s knowledge to improve future knowledge. The collective experiences of the NATO Nations with their diverse cultures can facilitate this, and this resource should be utilized.

## 2.7 REFERENCES

- [1] Baas, J.H. The Medical Culture of those Nations whose Development in Medicine is either already closed or is stationary (or not independent). The History of the Most Ancient Medicine and the Medicine of Primeval People. In Baas, J.H. Author. *Outlines of the History of Medicine and the Medical Profession*. New York: J.H. Vail & Co.; 1889:13-78.
- [2] Chiappelli, F., Prolo, P. and Cajulis, O.S. Evidence-based research in complementary and alternative medicine I: History. *Evid Based Complement Alternat Med*. 2005;2(4):453-458.
- [3] Eliade, M. General Considerations. Recruiting Methods. Shamanism and Mystical Vocation. In: Eliade, M. author *Shamanism: archaic technique of ecstasy*. Bolingen Series LXXVI. Princeton, NJ, USA. Princeton University Press; 1964:3-32.
- [4] Ergil, K. Chinese Medicine. In: Micozzi M.S., ed. *Fundamentals of Complementary and Integrative Medicine, 3rd ed.* St. Louis, MO, USA: Elsevier Saunders; 2006:393-417.
- [5] Ergil, K. Traditional Medicine of China and East Asia. In: Micozzi, Marc S, ed. *Fundamentals of Complementary and Integrative Medicine, 5th ed.* St. Louis, MO, USA: Saunders Elsevier; 2015:477-507.

- [6] Geiger, R. Homeopathy among the ancient Hindus and Arabians. *J Am Inst Homeopath*. 1945;38:387.
- [7] George, S., Jackson, J.L. and Passamonti, M. Complementary and alternative medicine in a military primary care clinic: A 5-year cohort study. *Mil Med*. 2011;176(6):685-688.
- [8] Goertz, C., Marriott, B.P. and Finch, M.D., et al. Military report more complementary and alternative medicine use than civilians. *J Altern Complement Med*. 2013;19(6):509-517.
- [9] Grammaticos, P.C. and Diamantis, A. Useful known and unknown views of the father of modern medicine, Hippocrates, and his teacher Democritus. *Hell J Nucl Med*. 2008;11(1):2-4.
- [10] Harner, M. Introduction. In: Harner, M. author. *The way of the shaman*. 3<sup>rd</sup> ed. San Francisco, CA, USA: Harper & Row; 1990:12-22.
- [11] Harner, M. Shamanism and States of Consciousness. In: Harner M. author. *The way of the shaman*. 3<sup>rd</sup> ed. San Francisco, CA, USA: Harper & Row; 1990:81-107.
- [12] Harner, M. The Shamanic Journey: Introduction. In: Harner, M. author. *The way of the shaman*. 3<sup>rd</sup> ed. San Francisco, CA, USA: Harper & Row; 1990:50-80.
- [13] Hoffman, C.J. Aromatherapy. In: Micozzi MS, ed. *Fundamentals of Complementary and Integrative Medicine 3rd ed*. St Louis, MO, USA: Saunders Elsevier; 2006:209-28.
- [14] Hong, F.F. History of Medicine in China When Medicine Took an Alternative Path. *MJM* 2004;8:79-84.
- [15] Hufford, D.J., Fritts, M.J. and Rhodes, J.E. Spiritual Fitness. *Mil Med*. 2010 August Suppl: 175:73-87.
- [16] Jonas, W., Deuster, P., O'Connor, F. and Macedonia, C. Total Force Fitness for the 21<sup>st</sup> Century A New Paradigm. *Mil Med*. 2010 August Suppl; 175:1-126.
- [17] Kroesen, K., Baldwin, C.M., Brooks, A.J. and Bell, I.R. US Military veterans' perceptions of the conventional medical care system and their use of complementary and alternative medicine. *Fam Pract*. 2002;19(1):57-64.
- [18] Lee, R. and Black, M.J. Chocolate: Healing 'Food of the Gods'? *Altern Ther Health Med*. 2001;7(5):120-222.
- [19] Lu, G.D. and Needham, J. China and the origin of examination in medicine. *Proc R Soc Med*. 1963;56(2):63-70.
- [20] Magner, L.N. Greco-Roman Medicine. In: Magner LN. *A History of Medicine*. New York: Marcel Dekker; 1992:63-80.
- [21] Magner, L.N. The Great Medical Traditions of India and China. In: Magner, L.N. author. *A History of Medicine*. New York: Marcel Dekker; 1992:37-62.
- [22] McPherson, F. and Schwenka, M.A. Use of complementary and alternative therapies among active duty soldiers, military retirees, and family members at a military hospital. *Mil Med*. 2004;169(5):354-357.

[23] Micozzi, A.M. and Micozzi, M.S. Magico-Religious Traditions and Neo-Shamanism. In: Micozzi, M.S. *Fundamentals of Complementary and Alternative Medicine*. 5<sup>th</sup> ed. St. Louis, MO, USA: Elsevier Saunders; 2015:667-73.

[24] Moir, D.M. Avenzoar-Averroes-and Extinction of the Arabian School. In: Moir DM. author *Outlines of Ancient History of Medicine*. Edinburgh, Scotland: Neill and Co. Printers; 1831:264-278.

[25] Oumeish, O.Y. The philosophical, cultural and historical aspects of complementary, alternative, unconventional and integrative medicine in the Old World. *Arch Dermatol*. 1998;134(11):1373-1386.

[26] Prioreschi, P. Alternative medicine in ancient and medieval history. *Med Hypotheses*. 2000;55(4):319-325.

[27] Qiu, X.I. *Chinese Acupuncture and Moxibustion*. New York: Churchill Livingstone; 1993.

[28] Rahman, H.S. Arab Medicine During the Ages. *Stud Hist Med Sci*. 1996;XIV(1-2):1-39.

[29] Rhodes, P. *An Outline History of Medicine*. Oxford, UK: Butterworth-Heinemann; 1985.

[30] Smith, T.C., Ryan, M.A. and Smith, B., et al. Complementary and alternative medicine use among US Navy and Marine Corps personnel. *BMC Complement Altern Med*. 2007;16:7:16.

[31] Thakkar, G.K. History of Shivambu. In: Thakkar GK. Author. *Shivambu Gita: Which Can Bestow upon you New Life*. Mumbai: Shree Nagesh Mudranalaya; 1996:41-47.

[32] Trotter, R.T. and Micozzi, M.S. Latin American Curanderismo. In: Micozzi MS. *Fundamentals of Complementary and Alternative Medicine*. 5<sup>th</sup> ed. St. Louis, MO: Elsevier Saunders; 2015:667-73.

[33] van der Kroon, C. *The Golden Fountain The Complete Guide to Urine Therapy*. Mesa, AZ, USA: Wishland Publishing, Inc.; 1996.

[34] Voss, R.W., Moerman, D.E. and Micozzi, M.S. Native North American Healing and Herbal Remedies. In: Micozzi, M.S. *Fundamentals of Complementary and Alternative Medicine*. 5<sup>th</sup> ed. St. Louis, MO, USA: Elsevier Saunders; 2015:623-38.

[35] White, M.R., Jacobson, I.G. and Smith, B., et al. Health care utilization among complementary and alternative medicine users in a large military cohort. *BMC Complement Altern Med*. 2011;11:27.

[36] Wong, K.C. and Wu, L.-T. Chinese Medicine Series 6. History of Chinese Medicine, 2<sup>nd</sup> edition. Taipei: Southern Materials Center, Inc. 1985. pp. 162-163.

[37] Zysk, K.G. Medicine and Buddhist Monasticism. In: Zysk KG. author. *Asceticism and Healing in Ancient India: Medicine in the Buddhist Monastery*, rev. ed. Oxford, UK: Oxford University Press; 1988:38-49.



## Chapter 3 – OVERVIEW OF INTEGRATIVE MEDICINE PRACTICES AND POLICIES IN NATO PARTICIPANT NATIONS

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### **ABSTRACT**

*CAMBRELLA* is a European research network for Complementary and Alternative Medicine (CAM). Between January 2010 and December 2013 the *CAMBRELLA* consortium reviewed the status of CAM in Europe from the perspectives of:

- 1) Terminology for description;
- 2) Citizens' needs and expectations;
- 3) Patients' usage patterns;
- 4) Providers' practice patterns; and
- 5) Regulatory and legal status in Europe.

Together, this data was used to form a set of recommendations to the European Commission (EC), the European Parliament, and national policy-makers and civil society stakeholders. These recommendations can serve as a

*roadmap for European CAM research. This article aims to inform the reader about CAM prevalence, usage perspectives, and the future roadmap for CAM practices and research within the European Union. Further, the North Atlantic Treaty Organization is positioned as a potential foundation for inclusion of CAM modalities within the militaries as well for as collaborative research on safe and cost-effective practices.*

*Keywords: CAM, CAMbrella Pan-European Project, Legislation of CAM, Provider Perspective, Regulation, Reimbursement, Survey on Members of EU, Usage of CAM.*

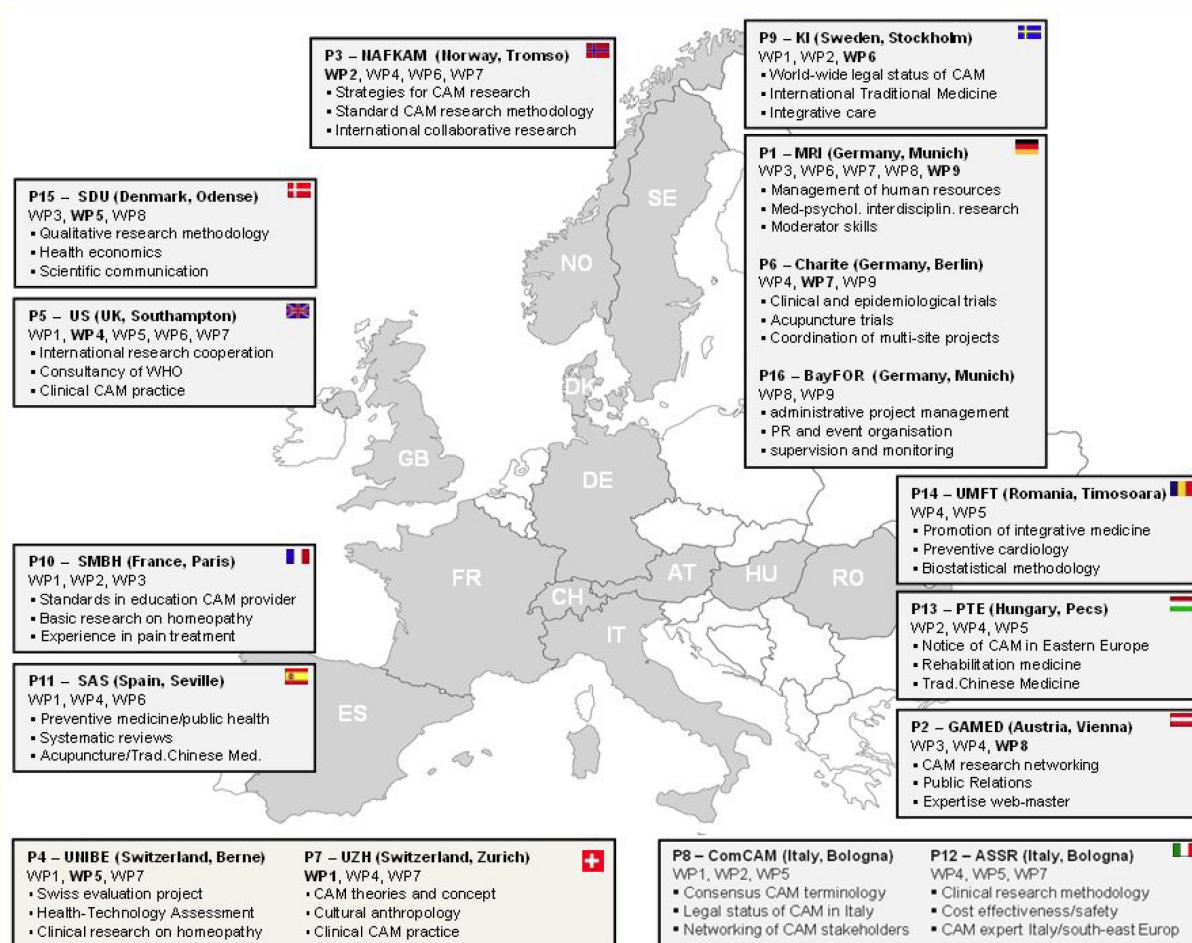
### **3.1 INTRODUCTION**

“Everyone has the right to benefit from any measures enabling [him or her] to enjoy the highest possible standard of health attainable.” – *European Social Charter adopted by the Council of Europe (1961 revised 1996)* [6].

Complementary and Alternative Medicine (CAM) represents a heterogeneous group of medical practices, often considered to be non-conventional. The public use of these modalities has been increasing over the past several decades [2]-[4], [9], [10], [15], [27]. In 2004, The European Federation for Complementary and Alternative Medicine (EFCAM) was founded to serve as a forum for specific CAM modalities as well as for national CAM umbrella organizations. The principal objective of the EFCAM is to ensure equal access to CAM modalities throughout Europe. The EFCAM states “CAM’s particular strength is the combination of individualised holistic care, capacity to provide health maintenance, illness prevention and non-invasive illness treatment as part of an integrated package” [12].

In 2009, the European Commission requested an evaluation of the status of CAM within Europe. The resulting coordination project, the CAMbrella Consortium, was formed with sixteen institutions from twelve European countries (Figure 3-1). The Consortium addressed the following areas:

- 1) The definition of CAM;
- 2) The prevalence of CAM usage; and
- 3) The attitudes of providers and patients regarding CAM. CAMbrella developed nine work packages and recommended six core areas, as a roadmap for the potential contribution of CAM for healthcare needs in the European Union.

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**Figure 3-1: CAMbrella Consortium Organization. Regional distribution and major expertise of the CAMbrella project partners. WP, work package; CAM, complementary and alternative medicine; WHO (World Health Organization); EU (European Union). Reprinted with permission from © S. Karger AG. Source: Weidenhammer [30].**

There is much debate surrounding CAM also known as Integrative Medicine (IM). The status of CAM in Europe is characterized by enormous heterogeneity in all aspects, including terminology used, methods provided, prevalence, and national legal status and regulation [11]. As such, there is no commonly accepted definition for CAM. There have been numerous efforts to define CAM. The U.S. National Center for Complementary and Alternative Medicine (NCCAM) once defined CAM as “a group of diverse medical and health care systems, practices and products that are not generally considered part of conventional medicine” [21]. Thus, once a practice modality is accepted as a conventional medicine modality, it is no longer considered to be CAM. Therefore, the list of CAM modalities changes, as the modalities become accepted conventional medicine modalities. To add to confusion, the terms *complementary and alternative medicine*, *complementary medicine*, *alternative medicine*, *integrative medicine*, and *integrative health and healing* are often used interchangeably.

The CAMbrella consortium reviewed numerous sources for the definition of CAM and selected the World Health Organization’s (WHO) definition of traditional medicine as the basis for a pan-European definition. CAMbrella defines CAM as:

“a variety of different medical systems and therapies based on the knowledge, skills and practices derived from theories, philosophies and experiences used to maintain and improve health, as well as to prevent, diagnose, relieve or treat physical and mental illness. CAM has been mainly used outside conventional health care, but in some countries certain treatments are being adopted or adapted by conventional health care” [14].

Adding to the difficulty in defining CAM, differences exist from country to country regarding what modalities are considered to be part of CAM. As an example, spiritual healing is considered to be a CAM modality within the United States and is included as a Medical Subject Heading (MeSH); however, this modality is excluded from the European definition of Spiritual practices because of the history of CAM within Europe.

Because there is no widespread acceptable definition of CAM and the modalities of medicine that contribute to it, this may have a negative impact on clinical practices, patient and provider perspectives, and research endeavors, especially research on collaborative efforts between CAM and conventional medicine practices.

### **3.2 NEEDS AND EXPECTATIONS REGARDING CAM**

Europe, like the rest of the world, faces a growing number of healthcare challenges. The aging population has resulted in a transformation of healthcare from care for acute illness to that of chronic disease management. The increasing development of technology and medications, coupled with the demand for their implementation, among other factors, has resulted in ever escalating healthcare costs and budgets. In addition, patients are searching for services that are consistent with personal beliefs as well as approaches that offer best results for health. CAM may offer solutions to these challenges as innovative and cost/health-added values for healthcare in Europe.

### **3.3 COMPLEMENTARY AND ALTERNATIVE MEDICINE UTILIZATION IN THE EUROPEAN UNION**

The prevalence of CAM utilization across the European Union is unclear. The CAMbrella consortium performed a systematic literature review on the subject. The group reviewed 87 general population studies on CAM utilization and concluded that the quality of reporting was poor. CAM use varied widely, with country variations from 0.3% to 86% (Table 3-1). In addition, there were only available data from fourteen of the thirty-nine European Union states. Therefore, making determinations on utilization based on population demographics was not possible. However, it was possible to report on the data descriptively. Herbal medicine was the most commonly reported CAM modality, followed by homeopathy, chiropractic, and acupuncture and reflexology (Table 3-2).

**Table 3-1: Prevalence of CAM in the EU.**

<i>Country</i>	<i>Prevalence Rates %</i>
Denmark	45 – 59
Finland	11 – 43
France	21
Ireland	15
Germany	4.6 – 62
Israel	5 – 43
Italy	16 – 84
Netherlands	17.2
Norway	9 – 53
Poland	14.4
Portugal	43.7
Slovenia	6.6
Spain	15 – 47
Sweden	5 – 64
Switzerland	5 – 57
Turkey	48 – 86
United Kingdom	0.3 – 71

**Table 3-2: Top Five Most Commonly Reported CAM Therapies in the EU.**

<i>Therapy</i>	<i>Prevalence Rates %</i>
Herbal Medicine	5.9 – 48.3
Homeopathy	2 – 27
Chiropractic	0.4 – 28.8
Acupuncture	0.44 – 23
Reflexology	0.4 – 21

Patients' use of CAM modalities varied. Patient dissatisfaction with conventional medicine was the most common reason for using CAM. Other reasons for the use of CAM included associated side effects of medications, preference for natural treatments, and a therapeutic alliance with CAM providers [8]. The CAMbrella study supported the study by the NCCAM, which showed that CAM is most often used for musculoskeletal conditions [8], [21]. The European Information Centre for Complementary and Alternative Medicine suggests that more than 100 million European Union citizens are regular users of CAM, largely for addressing chronic conditions [13]. EFCAM reports that:

“... between 20% and 80% of citizens in different EU countries have used CAM in their health care. They want to choose the therapeutic approach that they consider will produce the best result for their health, whether it is to maintain good health and to prevent illness, or to alleviate a health problem, and whether that belongs to conventional medicine or to CAM” [12].

The therapeutic spectrum of diseases seen in CAM practice differs from those seen in conventional practice. This conclusion cannot be drawn from the statements of numerous CAM organizations, but arises from systematic investigations of users and physician providers, such as the PEK [Program Evaluation Komplementärmedizin] performed in Switzerland [19]. Patients with chronic diseases that are mostly resistant to conventional therapies tend to choose CAM therapies (e.g., symptom control for cancer, pain, psychosomatic illness, and musculoskeletal conditions, as well as women with specific gynecologic problems, such as menstrual difficulties, pregnancy-related complications, and menopause, and for their children, who often have self-limiting minor problems) [29].

Healthcare costs/budgets and patient-covered benefits have an effect on the use of CAM. Within the European Union, access to CAM is often limited to patients who can pay for it. In the United Kingdom, it was shown in 1998 that 90% of CAM provision is purchased privately [25]. The effect of healthcare costs on national budgets threatens the healthcare system and sustainability. Healthcare costs are > 17% of the Gross National Product (GNP) in the United States and are expected to rise to nearly 20% of the GNP by 2025 [5]. Within the European Union, CAM may count for  $\leq 10\%$  of service, sales, and market of the GNP in the European Union. Therefore, globally, healthcare costs and utilization of CAM modalities have significant economic and social impacts. As such, CAM may have a significant impact on Nation budgets because CAM can be a lower cost modality. Thus, shifts from this inequitable access, chronic disease management, and increasing costs are required. The sustainability of healthcare services is at stake. The shift needs to be toward promotion and prevention of illness, more cost-effective treatments, and manageable costs. Although more data are required, CAM treatments and the CAM provider workforce may contribute to this needed shift [12].

### **3.4 PROVIDERS’ PATTERNS**

It is difficult to identify provider numbers within the European Union because of CAM’s varying legal status from country to country. CAMbrella reviewed various CAM societies in the European Union and crosschecked the results with available governmental data. CAMbrella reported that there are  $\approx 305,000$  registered CAM providers in the European Union. The breakdown is as follows:  $\approx 145,000$  Medical Doctors (MDs) and  $\approx 158,000$  non-medical practitioners. Comparatively, this translates to 65 CAM providers per 100,000 inhabitants versus 95 MD General Practitioners (GPs) per 100,000 inhabitants. The number of practitioners in the top five CAM methods were acupuncture (96,380), homeopathy (50,300), herbal medicine (29,000), reflexology (24,600) and naturopathy (22,300). See Table 3-3 for data on the top 15 CAM methods [29]. MDs dominate the fields of acupuncture and homeopathy whereas non-medical practitioners, by self-declaration, almost exclusively provide herbal medicine and reflexology. Anthroposophic medicine has very few non-MDs and neural therapy is practiced only by MDs. Anthroposophic medicine is a form of complementary medicine developed in the 1920’s by Rudolf Steiner which incorporates both conventional and complementary medicine. Although CAM is predominantly provided privately there is evidence that, at least in some countries, CAM is provided collaboratively with conventional practitioners. According to the European Federation for Complementary and Alternative Medicine, CAM practitioners “offer a whole person approach to health with a focus on supporting the person’s health-maintaining capacities and within which illness is treated according to the distinct diagnostic and treatment methods of the modalities used” [12]. This statement was independent of whether the CAM treatment was offered as a stand-alone method or was complementary with conventional medicine [12].

Table 3-3: Most Frequently Provided CAM Disciplines in the EU 27+12 (by End of 2010) [29].

<i>CAM Discipline</i>		<i>Non-Medical Practitioners</i>	<i>MDs (Physicians)</i>	<i>MDs + Non-Medical Practitioners</i>	<i>Therapists per 100,000 Inhabitants</i>
(1)	Acupuncture	16,380	80,000	96,380	21
(2)	Individual homeopathy	4,500	45,000	50,300	11
(3)	Herbal medicine / phytotherapy	29,000	??	> 29,000	6.5
(4)	Reflexology	24,600	??	> 24,600	5.5
(5)	Naturopathy (GER: "Naturheilverfahren")	7,300	15,000	22,300	5.0
(6)	Antihomotoxicology (Complex homeopathy)	20,000	10,000	> 20,000	4.5
(7)	Humoral/drain-off therapy (Purgation therapy)	17,000	?	> 17,000	3.8
(8)	Kinesiology	7,600	??	> 7,600	1.7
(9)	Shiatsu- massage therapy	7,400	?	> 7,400	1.7
(10)	Orthomolecular therapy	7,000	2,000	> 7,000	1.5
(11)	Manual therapies (Chiropractic, Osteopathy)	4,900	500	> 5,000	1.2
(12)	Anthroposophic medicine (GER: 20)	3,000	4,500	4,500	1.0
(13)	Oxygen/ozone therapy	2,500	??	> 3,000	.6
(14)	Kneipp therapy (GER)	—	500	> 2,500	.5
(15)	Neural therapy (Huneke)	—	1,500	1,500	.3
	Total	≈ 158,000	≈ 145,000	≈ 305,300 (100%)	65

Reporting of CAM varies within the European Union. Geographically, the best data acquisition was possible for MDs in Northern and Central Europe with limited provision in the South more than the North and the East more than the West. Individual therapists using multiple provisions of CAM disciplines may contribute to the reporting bias. As an example, in Switzerland, 1,665 individually counted therapies were reported as being provided by 995 non-medical Traditional Chinese Medicine practitioners. As a result, CAMbrella was unable to include 30,410 practitioners in 26 countries practicing acupuncture and Chinese herbal medicine.

### 3.5 COMPLEMENTARY MEDICINE AND MEDICAL EDUCATION

The fact that there is increasing demand for availability of, and accessibility to, CAM modalities and an acceptance of CAM in public healthcare systems of the world, CAM or IM needs to become a part of undergraduate and postgraduate medical education [16]. However, there are sparse data on the CAM training for providers in the European Union. Furthermore, there are substantial variations in the professional backgrounds

of identical CAM providers across the European Union. In 1986, Wharton and Lewith assessed the attitudes of General Practitioners (GPs) regarding CAM. This study showed that about “38% of GPs had received some training in CAM and about 10% had completed specialist training in complementary medicine. Further approximately 15% desired to acquire CAM skills” [31]. In the 1920’s, Steiner and Wegman founded the concept of Anthroposophic Medicine (AM), a medical approach incorporating both conventional and complementary medicine [23]. Anthroposophic hospitals exist within the public healthcare systems in Germany and Switzerland and offer post-medical education in individual holistic medicine treatments. In Europe, there are > 2,000 AM trained physicians; worldwide AM physicians practice exists in 56 countries [1].

### **3.6 PROVIDERS’ PERSPECTIVES ON CAM**

Despite the lack of significant CAM education, medical providers nonetheless use CAM modalities in their practices. In the Wharton and Lewith study of providers’ perspectives, it was shown that 59% of doctors (GPs) thought that the complementary techniques being assessed were useful to their patients: 76% had referred patients for this type of treatment over the past year to medically qualified colleagues and 72% had referred patients to non-medically qualified practitioners. These researchers concluded that the GP views were influenced positively by the observed benefit to their patients (41%) and personal or family experiences of benefit (38%) [31]. Other studies support Wharton and Lewith’s findings. Déglon-Fischer et al. queried 750 Swiss primary care physicians regarding CAM in their practices. The researchers found that 14.2% of the physicians were qualified in at least one CAM discipline while 62.5% referred their patients to CAM providers [7]. Three-quarters of British fund-holding GPs want complementary medicine available through the National Health Service, particularly osteopathy, acupuncture, chiropractic, and homeopathy [20].

### **3.7 STATUS OF CAM RESEARCH IN THE EUROPEAN UNION**

Barriers to the integration of CAM within conventional medicine often have foundations in the lack of sufficient scientific evidence. Clinically relevant publications were very scarce. Eight peer-reviewed papers dealing primarily with clinical European CAM provision were identified in the last decade: Joos et al. [17], Déglon Fischer et al. [7], van Haselen et al. [28], Thomas et al. [24], [26], Lewith et al. [18], Schmidt et al. [22] and Thomas et al. [25]. CAM research in Europe is not well funded by the countries or research organizations, unlike CAM research in the United States. Much of European CAM research is charitably supported. Often, conventional medicine research receives award monies, resulting in limited research funds that must be competed for. The impact of limited CAM research on the decision-making processes regarding CAM practices cannot be understated. CAM research needs to be advanced, with national and international organizations in order to achieve a systematic and unbiased view of the cost-effectiveness of CAM so as to allow integration of CAM with conventional medicine.

### **3.8 IMPACT OF CROSS-BORDER VARIATIONS**

When practitioners cross borders, these practitioners encounter substantial variations in CAM practices within Europe. This raises serious concerns with regard to the predictability, quality, and safety of healthcare delivery to European citizens. When CAM professions in some countries are tightly regulated, while the same professional categories in other countries are totally unregulated, an establishment of collegial common ground is very challenging. When researchers cross borders these researchers find that research on efficacy and effectiveness of CAM is hampered severely by the conglomerate of European regulations. Practices and practitioners are not comparable across national boundaries, and any observational or experimental study will therefore be generalizable only within a narrow national or cultural context.

### **3.9 REGULATORY AND LEGAL STATUS OF CAM IN EUROPE**

There is no unifying legislative consensus of non-conventional practices within the European Union. In fact, there seems to be two distinct streams of thought that are in conflict with each other. One concept is that only medical professionals (MDs or comparable to MDs) are entitled to practice healthcare and treat illnesses. The other concept allows for anyone with a desire to practice healthcare to do so. This can cause significant problems leading to unequal treatments for European citizens.

In fact, various European Union treaties have repeatedly established that health policies are national responsibilities for the member states, even if several European Union directives, regulations, and resolutions influence how member states organize their national health policies and services. The cross-border healthcare directive of the European Parliament in 2011 respected the established differences in national healthcare systems [32]. The aim of the directive was to remove obstacles to the fundamental freedom of patients to choose healthcare across borders. This could potentially also include CAM treatments in countries where CAM treatment is included in the public health services. Regional collaboration among providers, purchasers, and regulators from the different member states can ensure safe, high-quality, and efficient cross-border healthcare at regional levels. Historical and cultural similarities between neighboring countries would thus seem to have the best chance to facilitate cross-border opportunities in the CAM area more than European Union-wide directives, regulations, and decisions [33].

CAM treatment is either unregulated or regulated within the framework of the public health systems. The only commonality across the European Union is that structuring legislation and regulation differs in each country. A review of the policies of thirty-nine countries was performed. Of those thirty-nine countries, nineteen have general CAM legislation, eleven have specific CAM laws, and six have sections on CAM included within their health laws, such as “law on healthcare” or “law on health professionals”. Detailed information regarding the European Union countries is presented in the CAMbrella deliverable report [32].

A review of twelve treatment modalities showed considerable variation as well. Acupuncture and chiropractic are regulated in twenty-six countries, homeopathy in twenty-four countries, massage in twenty countries, osteopathy in fifteen countries, traditional Chinese and herbal/phytotherapy medicine in ten countries, naturopathy in eight countries, anthroposophic medicine in seven countries, Ayurveda in five countries, neural therapy in three countries, and, finally, naprapathy in two countries. Regulation of practice is in general mostly tied to formal education and/or training in conventional or non-conventional medicine. Regulated providers of CAM are usually identified as:

- 1) MDs;
- 2) Health professionals; or
- 3) Non-conventional practitioners.

The latter category can include individuals with little or no medical training. Germany, Switzerland, and Liechtenstein have established the title of *Heilpraktiker* or *Naturheilpraktiker* or health practitioner [32].

### **3.10 HARMONIZATION OF REGULATIONS FOR INCREASED PATIENT SAFETY**

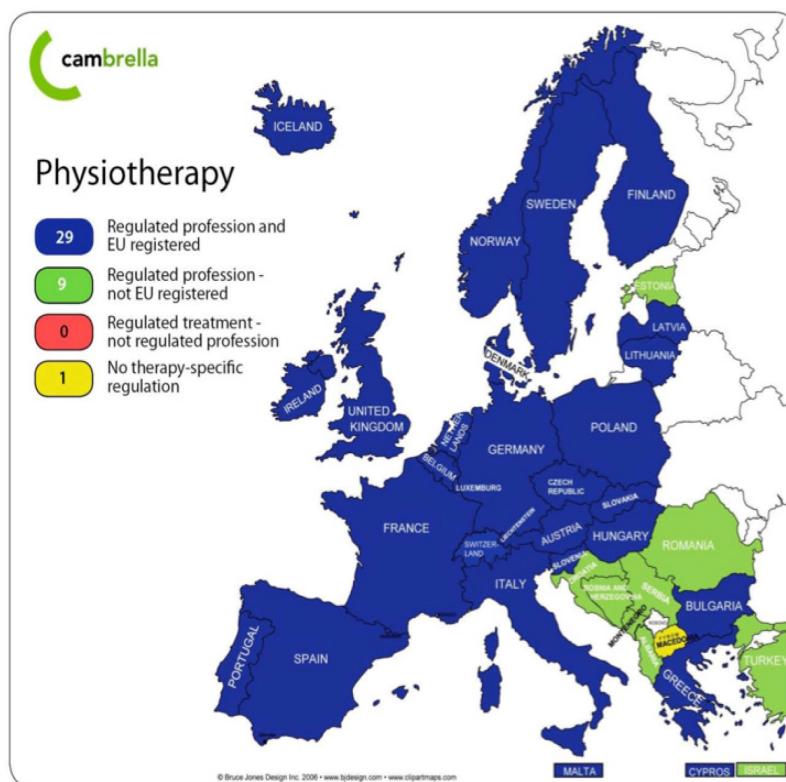
Patient choice in healthcare is seen as a core value within Europe and is reflected in the diversity in CAM legislation/regulations. Varied and inconsistent provider backgrounds make seeking informed treatments very challenging. Predictable and safe healthcare is a necessary requirement for patient care. Across Europe, conventional medicine is predictable enough because of the passage of various directives. This is not the case

with CAM practices. The harmonization of CAM legislation and regulations may be an important step forward for wider acceptance of CAM within the medical communities.

In principle, there are two options for achieving a higher degree of harmonization:

- 1) Legislation and regulation at the European Union and European Economic Area (EU/EEA) level; or
- 2) Voluntary harmonization.

It is unlikely that there will be EU/EEA level legislation/regulation in the foreseeable future because the European Union has repeatedly upheld its position of leaving this to the individual country. Voluntary harmonization is, however, possible within current legislation. The successful mutual recognition of physiotherapists across Europe shows how this can be done and could be a potential template for development of harmonized regulation also of CAM professions in Europe (Figure 3-2). As such, physiotherapists have few obstacles when they move from one country to another. Furthermore, patients are ensured that physiotherapists across the European Union have similar backgrounds and experience [32].



**Figure 3-2: Regulation of Physiotherapy Within the European Union (EU).**  
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### 3.11 DISCUSSION

The difficulty in evaluating complementary medicine across the European Union is multi-factorial and is as complex as the differences between the countries. Despite this, some general comments can be made. Healthcare

systems are being jeopardized largely because of escalating healthcare costs and budgets compounded by the shift from acute care to chronic disease management. Furthermore, patients are increasingly dissatisfied with conventional medicine. Therefore, patients as well as providers perceive CAM as a viable option to meet these challenges.

The data on CAM utilization across the European Union is unclear as a result of varying education standards, regulatory differences, and reporting mechanisms. However, it is clear that the population is using CAM and that it is either used alone or in conjunction with conventional medicine. CAM is used to address many conditions and problems; most commonly and consistently across various countries, it is used to treat musculoskeletal issues. In addition, patients are seeking treatments that are consistent with these patients' beliefs about health and healthcare. At times, this is contradictory to the established medical communities' point of view. Therefore, the goal needs to be cooperation and a desire to develop a new system that blends aspects of conventional medicine with CAM to optimize healthcare delivery and the health of the population. The net results will be greater patient and provider satisfaction and less strain on national budgets, with lower healthcare costs as well as a shift from disease management to health maintenance.

### **3.12 CONCLUSIONS**

CAM is leading to a rethinking of our current healthcare systems, albeit this is contentious at times. CAM potentially offers a system of cost-saving, low-risk treatments that can be used in conjunction with conventional medicine. However, there are numerous problematic areas within CAM that need to be addressed before it will achieve wide acceptance.

First, a universally acceptable definition of the CAM terminology is needed. This lack of consistency makes evaluation of CAM methods and modalities nearly impossible. Thus, common language would assist collaborative partnerships, evaluations, and research endeavors to improve healthcare delivery systems. The overall net effect could be a healthier population with better outcomes and patient satisfaction.

Second, there needs to be common regulations regarding provision of care, credentialing of providers, and educational standards. In areas with little-to-no regulations, CAM providers exist with little or no medical education. This can lead to CAM being vulnerable to the claim that CAM is nothing more than quackery. Consistent regulations in all areas will elevate the field of CAM so that there is greater acceptability within the established medical community; a community that often dictates policy and budgets.

Finally, collaborative research efforts in CAM modalities are necessary. Cost-effectiveness research of individual CAM modalities as well as combined treatment plans of CAM with conventional medicine should be emphasized.

Each area listed is pivotal to the success of the others. The ultimate goal for the medical community must be the health of the population – locally, regionally, and globally. It is necessary to put all “egos” aside and re-evaluate the status quo of our current systems. Only when all work together will it be possible to improve healthcare to a system of caring for health.

### **3.13 RECOMMENDATIONS**

There is worldwide interest and positive attitudes regarding CAM. Patients are pushing health systems to be holistic, cost-effective, and patient-centered. CAM practices are multi-cultural and, therefore, international

partnerships are required. The North Atlantic Treaty Organization (NATO) medical communities can serve as an outstanding foundation for these partnerships. Effective and safe therapies can be officially introduced in NATO Military systems. NATO-sponsored, collaborative, international, and cross-cultural research on improved performance, improved mental-psychologic-emotional well-being, and budget-reducing treatments needs to be conducted. The high degree of receptivity suggests the need for both faculty training for MDs working in the Military systems as well as in curriculum development.

### 3.14 REFERENCES

- [1] Anthroposophic medicine in brief: Facts and Figures. International Federation of Anthroposophical Medical Associations; 2005. [Internet]. [http://www.ivaa.info/IVAA\\_new/factsheet.htm](http://www.ivaa.info/IVAA_new/factsheet.htm). Retrieved on 12 November 2014.
- [2] Barnes, P.M., Powell-Griner, E., McFannm, K. and Nahin, R.L. Complementary and alternative medicine use among adults: United States, 2002. *Adv Data*. 2004 May;(343):1-19.
- [3] Bodeker, G., Ong, C.K., Grundy, C., Burford, G. and Shein, K. *WHO Global Atlas of Traditional, Complementary and Alternative Medicine*. WHO Kobe Centre World Health Organization; 2005.
- [4] Bücker, B., Groenewold, M., Schoefer, Y. and Schäfer, T. The use of complementary alternative medicine (CAM) in 1001 German adults: results of a population-based telephone survey. *Gesundheitswesen*. 2008;70(8-9):e29-36.
- [5] Centers for Medicare and Medicaid Services (2013) *National Health Expenditure Projections 2013-2023 Forecast Summary* CMS, Baltimore, MD, USA. [Internet]. <http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/Proj2013.pdf>. Retrieved on 2 February 2014.
- [6] Council of Europe. [Internet]. <http://conventions.coe.int/treaty/en/treaties/html/163.htm>. 30 April 2014.
- [7] Déglon-Fischer, A., Barth, J. and Ausfeld-Hafter, B. Complementary and alternative medicine in primary care in Switzerland. *Forsch Komplementmed*. 2009 August;16(4):251-5.
- [8] Eardley, S., Bishop, F. and Prescott, P., et al. A Systematic Literature Review of Complementary and Alternative Medicine Prevalence in EU. *Forschende Komplementarmedizin*. 2012;19(suppl 2);18-28.
- [9] Eisenberg, D.M., Davis, R.B. and Ettner, S.L., et al. Trends in alternative medicine use in the United States, 1990-1997: results of a follow up national survey. *JAMA*. 1998;280(18):1569-1575.
- [10] Eisenberg, D.M., Kessler, R.C., Foster, C., Norlock, F.E., Calkins, D.R. and Delbanco, T.L. Unconventional medicine in the United States: Prevalence, costs, and patterns of use. *N Engl J Med*. 1993 January;328(4):246-52.
- [11] European Commission (2012) *Final Report Summary – CAMbrella (A pan-European research network for complementary and alternative medicine (CAM))* (Cordis) Germany: Cordis. [Internet]. [http://cordis.europa.eu/result/rcn/57185\\_en.html](http://cordis.europa.eu/result/rcn/57185_en.html). [http://cordis.europa.eu/result/rcn/57185\\_en.html](http://cordis.europa.eu/result/rcn/57185_en.html). 2 December 2014.
- [12] European Federation for Complementary and Alternative Medicine (EFCAM). [Internet]. [www.efcam.eu](http://www.efcam.eu). 4 April 2014.

- [13] European Information Centre for Complementary and Alternative Medicine (2008) *EICCAM Brochure* EICCAM, Brussels, Belgium. [Internet]. <http://www.eiccam.eu/pdfs/eiccambrochurecomplete.pdf> Retrieved 8 August 2014.
- [14] Falkenberg, T., Lewith, G. and Roberti di Sarsina, P., et al. Towards a Pan-European Definition of Complementary and Alternative Medicine – a Realistic Ambition? *Forschende Komplementarmedizin*. 2012;19(suppl 2);6-8.
- [15] Härtel, U. and Volger, E. Use and acceptance of classical natural and alternative medicine in Germany – findings of a representative population-based survey. *Forsch Komplementarmed Klass Naturheilkd*. 2004;11:327-334.
- [16] Heusser, P., Eberhard, S., Berger, B., Weinzirl, J. and Orlow, P. The subjectively perceived quality of postgraduate medical training in integrative medicine within the public healthcare systems of Germany and Switzerland: the example of anthroposophic hospitals. *BMC Complement Altern Med*. 2014 June;14:191.
- [17] Joos, S., Musselmann, B. and Szecsenyi, J. Integration of Complementary and Alternative Medicine into Family Practices in Germany: Results of a National Survey. *Evidence-Based Complementary and Alternative Medicine?*: eCAM. 2011, 495813. [Internet]. <http://doi.org/10.1093/ecam/nep019>.
- [18] Lewith, G. and Aldridge, D., eds. *Complementary Medicine and the European Community*. Saffron Walden, UK, CW Daniel Company Ltd.; 1991:1-160.
- [19] Melchart, D., Mitscherlich, F., Amiet, M., Eichenberger, R. and Koch, P. *Program Evaluation Komplementärmedizin (PEK)*. (2005) Schlussbericht, Bern, Switzerland. [Internet]. <http://www.bag.admin.ch/themen/krankenversicherung/00263/00264/04102/index.html?lang=de>. Retrieved 10 August 2014.
- [20] National Association of Health Authorities and Trusts Research. *Complementary therapies in the NHS. [Paper 10]*. Birmingham: NAHAT, 1993.
- [21] National Center for Complementary and Alternative Medicine (2012) NCCAM Publication No. D347. *CAM Basics What Is Complementary and Alternative Medicine?* (NCCAM), Bethesda, MD, USA: NCCAM. [Internet]. <http://nccam.nih.gov/health/whatiscam> Retrieved 15 July 2014.
- [22] Schmidt, K., Jacobs, P.A. and Barton, A. Cross-cultural differences in GPs' attitudes towards complementary and alternative medicine: a survey comparing regions of the UK and Germany. *Complement Ther Med*. 2002;10:141-147.
- [23] Steiner, R. and Wegman, I. *Extending practical medicine Fundamental principles based on the science of the spirit*. Bristol, UK: Rudolf Steiner Press; 2000. pp. 1-144.
- [24] Thomas, K.J., Coleman, P., Weatherley-Jones, E. and Luff, D. Developing integrated CAM services in primary care organisations. *Complement Ther Med*. 2003;11:261-267.
- [25] Thomas, K.J., Nicholl, J.P. and Coleman, P. Use and expenditure on complementary medicine in England: a population based survey. *Complement Ther Med*. 2001 March;9(1):2-11.
- [26] Thomas, K.J. and Nicholl, J.P. Trends in access to complementary or alternative medicines via primary care in England: 1995 – 2001 results from a follow-up national survey. *Fam Pract*. 2003;20:575-577.

- [27] Tindle, H.A., Davis, R.B., Phillips, R.S. and Eisenberg, D.M. Trends in Use of Complementary and Alternative Medicine by US Adults: 1997 – 2002. *Altern Ther Health Med.* 2005 January/February; 11(1):42-49.
- [28] van Haselen, R.A., Reiber, U., Nickel, I., Jakob, A. and Fisher, P.A.G. Providing Complementary and alternative medicine in primary care: the primary care workers' perspective. *Complement Ther Med.* 2004;12:6.
- [29] von Ammon, K., Cardini, F. and Daig, U., et al. (2012) *Health Technology Assessment (HTA) and a map of CAM provision in the EU Work package No. 5 Deliverable D6 – updated*. [Internet]. [https://phaidra.univie.ac.at/detail\\_object/o:300096](https://phaidra.univie.ac.at/detail_object/o:300096). Retrieved 8 August 2014.
- [30] Weidenhammer, W., Lewith, G., Falkenberg, T., Fønnebø, V., Johannessen, H., Reiter, B., Uehleke, B., von Ammon, K., Baumhöfener, F. and Brinkhaus, B. EU FP7 Project 'CAMbrella' to Build European Research Network for Complementary and Alternative Medicine. *Forsch Komplementmed.* 2011;18:69-76.
- [31] Wharton, R. and Lewith, G. Complementary Medicine and the General Practitioner. *BMJ* 1986 June;292(6534):1498-1500.
- [32] Wiesener, S., Falkenberg, T. and Hegyi, G., et al. (2012) *Legal status and regulation of CAM in Europe Part I – CAM regulations in the European Countries*. [Internet]. [https://phaidra.univie.ac.at/detail\\_object/o:291583](https://phaidra.univie.ac.at/detail_object/o:291583). Retrieved 8 August 2014.
- [33] Wiesener, S., Falkenberg, T. and Hegyi, G., et al. (2012) *Legal status and regulation of CAM in Europe Part II – CAM regulations in EU/EFTA/EEA*. [Internet]. [https://phaidra.univie.ac.at/detail\\_object/o:291585](https://phaidra.univie.ac.at/detail_object/o:291585). Retrieved 8 August 2014.

## Chapter 4 – INTEGRATIVE MEDICINE EXPERIENCE IN THE UNITED STATES DEPARTMENT OF DEFENSE

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### **ABSTRACT**

*Over the past fifteen years, the use of Complementary and Alternative Medicine (CAM) services, currently described as Integrative Medicine (IM), has continued to rise in the United States. The trends seen in the civilian population are mirrored within the United States Military. This article describes the change in the prevalence of Integrative Medicine Services, budgeting of those services as well as on-going research in Integrative Medicine within the Department of Defense Medical Treatment Facilities from 2005 through 2009. The Deputy Chief of Clinical Services (DCCS) or Service equivalent was contacted at 14-selected Defense of Department (DoD) Medical Treatment Facilities (MTF). Comprehensive structured telephone interviews were conducted using a formatted 20-item questionnaire. The questionnaire design was of a mixed model with open and closed formats as well as dichotomous yes/no questions. The initial survey was conducted in 2005 with a follow-up survey conducted in 2009. Survey results showed there has been a steady increase in the number of Integrative Medicine services available in the DoD Medical Treatment Facilities from 2005 through 2009. Acupuncture, biofeedback, nutritional counseling and spiritual healing were the most prevalent Integrative Medicine services in 2009. Funding sources changed from central funding (Offices of the Surgeon General) to Congressional and local funding. It is essential that the DoD medical community provides safe and effective treatments by providing oversight of Integrative Medicine services, collaboration of research, credentialing of practitioners and the establishment of educational programs.*

**Keywords:** Alternative Medicine, Comparative Study, Complementary Therapies/Utilization, Department of Defense, Integrative Medicine, Military Personnel/Statistics and Numerical Data, Prevalence, Questionnaires, Utilization.

### **4.1 INTRODUCTION**

Healthcare has continued to evolve, change, and grow over the past several decades. Some of these changes have been patient driven. People are turning to “alternative medicine” for treatment because the current model of care is not meeting their needs. The prevalence of CAM use has increased since it was first studied in the early 1990’s. In studies by Eisenberg et al. the usage of CAM services among the general U.S. population has increased from 33.8% in 1990 to 42.1% in 1997 [5] and 62% in 2002 [18]. The National Health Interview

Survey (NHIS) reported similar findings with an increased prevalence of 31% over the eight-year period studied (28.9% increased to 38% from 1999 until 2007) [2]. Eisenberg also reported that the number of visits to non-traditional providers in the United States has exceeded the number of visits to all primary care providers. Further, Americans are willing to pay more out-of-pocket for CAM treatments than for out-of-pocket hospitalizations [6].

The trends in the United States Military mirror those reported in the civilian medical settings. A study at Madigan Army Medical Center showed that 81% of Active Duty Soldiers, retirees and family members used one or more CAM services, with 69% requesting such services be offered at the Military Treatment Facility (MTF) [13]. Further, a study of U.S. Navy and Marine Corps personnel showed that 37% of the personnel have used one or more CAM services. Herbal therapies were the most common reported [17].

The Department of Veteran Affairs (VA) population is similar to that of the DoD. The Department of Veterans Affairs Technical Advisory Group (TAG) in collaboration with the HAIG (Healthcare Analysis and Information Group) surveyed all of the VA facilities in 1998 and 2011. Their report showed 88% (125/141) of the Veterans Health Administration (VHA) facilities use CAM services either on site or by referral. The final conclusions of the HAIG study questioned the direction and the goals of the medical care including CAM provider qualifications, evidence-based research and oversight. These observations were noted in 2011 as well as guidance on documentation, privileging, credentialing and Veterans interest and utilization of CAM services [11], [3].

There are numerous studies that evaluate the usage of CAM among Military beneficiaries and their perspective on CAM vs. convention medicine [7]-[9], [1], [10], [19]. One such study performed at the Southern Arizona VA Healthcare system, showed that the use of CAM was not necessarily associated with conventional care overall but rather in a few very specific areas. These included prescription side effects, lack of preventive medicine and emphasis on nutrition and exercise and the desire to have a more holistic healthcare plan [12].

Commercial bombardment of promises of euphoric lives, better and trims bodies as well as pain free-living fuels the demand. Although there has been an increasing body of research, there is much to be learned regarding Complementary and Alternative Medicine's (CAM) safety and efficacy. The former National Center for Complementary and Alternative Medicine (NCCAM) defined CAM as group of diverse medical and healthcare systems, practices, and products that are not presently considered to be part of conventional medicine. Integrative Medicine (IM) refers to the practice that combines both conventional and CAM treatments for which there is evidence of safety and effectiveness [14]. Recently, the NCCAM changed its name to National Center on Complementary and Integrative Health to better reflect the evolution of the field.

This increasing trend in usage and the willingness to pay out of pocket has prompted the medical community to react. It is incumbent upon us as a medical community to guide patients to make intelligent decisions about their health and medical care. If we do not engage and provide some oversight, patients have shown that they will seek out alternative treatments without our input.

Often the United States Military Healthcare System (MHS) has been on the forefront of medical advancements such as air evacuation, trauma care, hemostasis and hemorrhage control as well as prosthetics technology. Often this has been the result of an urgency to meet the needs of our battle injured. The Military is taking a lead in IM as well. In 2009, The Army Surgeon General chartered the Pain Management Task Force to review the current status of pain management within the Department of the Army. In 2010, the Task Force published its report with the recommendation of a comprehensive pain management strategy focused on an interdisciplinary, holistic, multi-modal patient centered approach [15]. As a result of this initiative, The Office of the Surgeon General of the Army was recognized by the American Academy of Pain Medicine for its efforts of a holistic approach in

pain management; efforts that included improved anesthesia at point of injury to non-pharmacological approaches such as mindfulness, acupuncture and biofeedback.

Therefore, to best serve the medical community, baseline information of available services, usage patterns, belief systems and perceptions about CAM needs to be obtained. This survey will serve to identify the available CAM services within fourteen-selected Medical Treatment Facilities (MTF) within the Department of Defense as well as evaluate the changes over time from 2005 to 2009. Combined, the studies from 2005 and 2009 will serve to better understand the broader context of CAM usage within the DoD and establish a baseline for further studies regarding usage, feasibility, accessibility, acceptability and sustainability for CAM policy development as well as the new paradigm of holistic approaches to medical management.

## **4.2 METHODS**

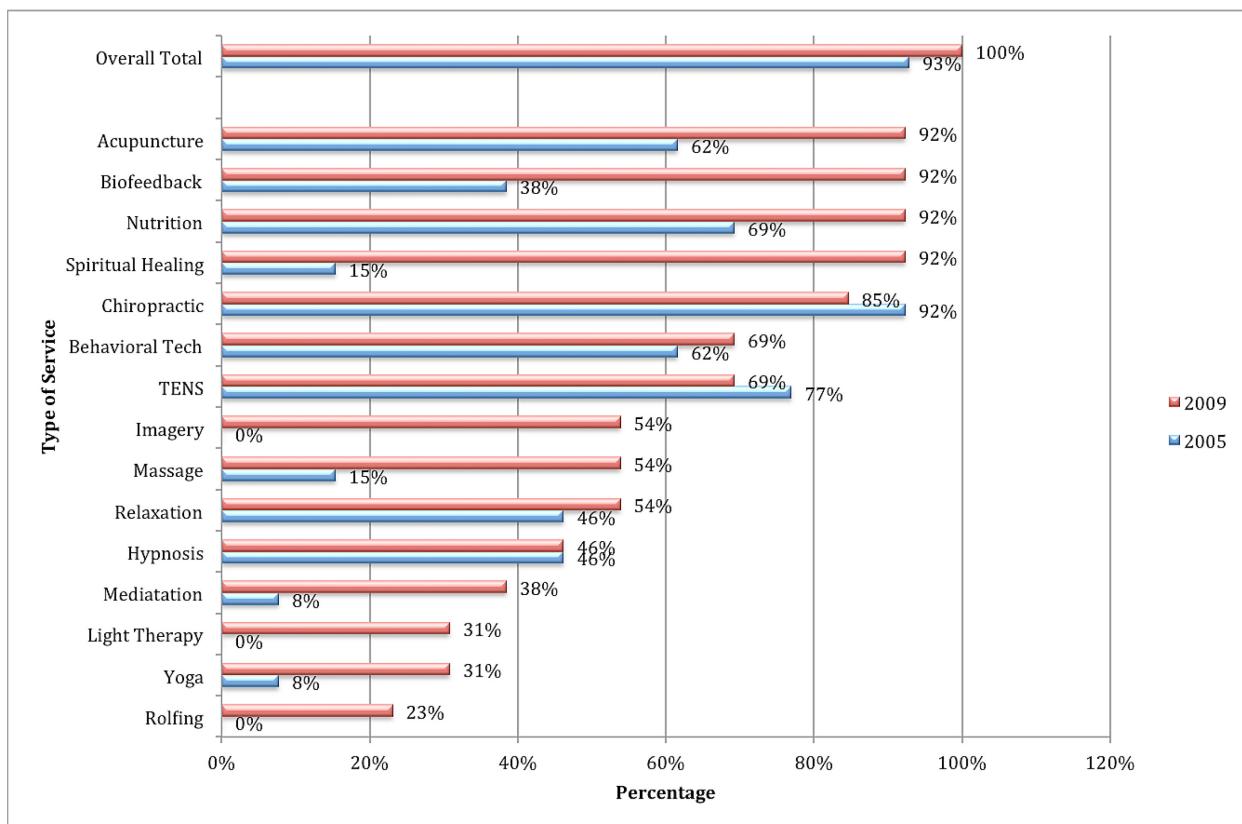
The Deputy Chief of Clinical Services (DCCS) or Service equivalent was contacted at 14 selected Defense of Department (DoD) Medical Treatment Facilities (MTF). The Medical Centers for each service were selected. In 2009, only thirteen facilities responded, thus the N was 14 in 2005 and 13 in 2009. These MTFs represent the Department of Defense equivalent of civilian academic hospitals. Within the DoD there are 8 Army, 3 Naval and 2 Air Force Medical Centers. The Great Lakes Naval Health Clinic was also surveyed. These sites were selected as a representative of each service because of their Medical Center status. Comprehensive structured telephone interviews were conducted using a formatted 20-item questionnaire. The questionnaire design was of a mixed model with open and closed format as well as dichotomous yes/no questions. The questions covered the subject areas of available services, budgeting, and research. The initial survey was conducted in 2005 with a follow-up survey conducted in 2009.

## **4.3 MAIN OUTCOME MEASURE**

The prevalence of IM services within selected DoD facilities.

## **4.4 RESULTS**

The 2005 initial study showed that 93% (N = 14) of the surveyed facilities offer IM services with 43% offering six or more modalities. This increased to 100% (N = 13) in 2009 with 92% offering six or more modalities. There was one site, which offered 19 IM services in 2009 representing an increase in services of 171% compared to 2005. However, the greatest increase in the number of services available was 333% with 3 available services in 2005 compared to 13 in 2009. The top four IM services were acupuncture, biofeedback, nutritional counseling and spiritual healing in 2009 compared to chiropractic, Transcutaneous Electrical Nerve Stimulation (TENS), nutritional counseling and meditative behavioral techniques in 2005 (Figure 4-1).

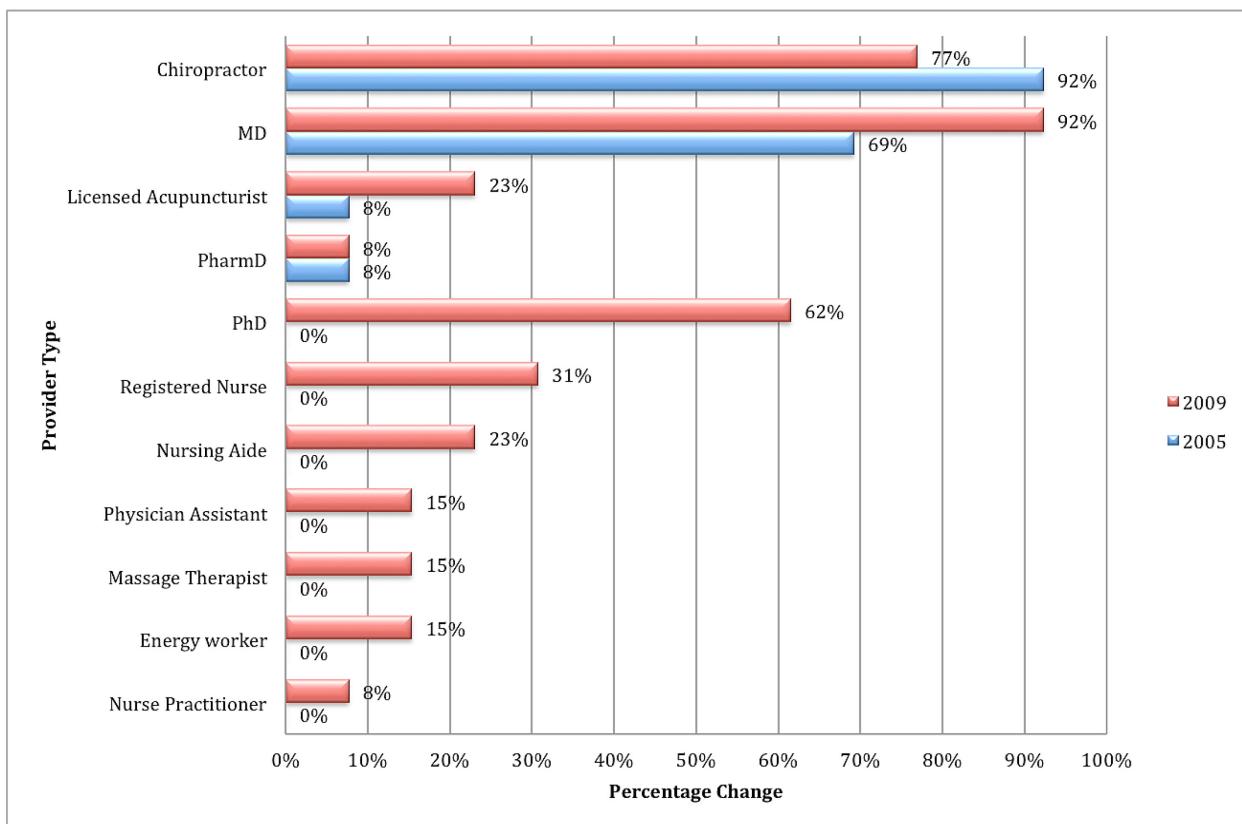


**Figure 4-1: Changes in Integrative Medicine Service Types Available at Selected U.S. Department of Defense Facilities from 2005 to 2009.**

There was not a single modality that was available at all facilities. Those modalities with the greatest increase in availability from 2005 to 2009 were spiritual healing (500%), meditation (400%), yoga (300%), and massage therapy (250%). 75% of the sites in 2009 added at least one new IM modalities with imagery added at seven sites and light therapy at four sites. There were two sites that decreased the number of available modalities.

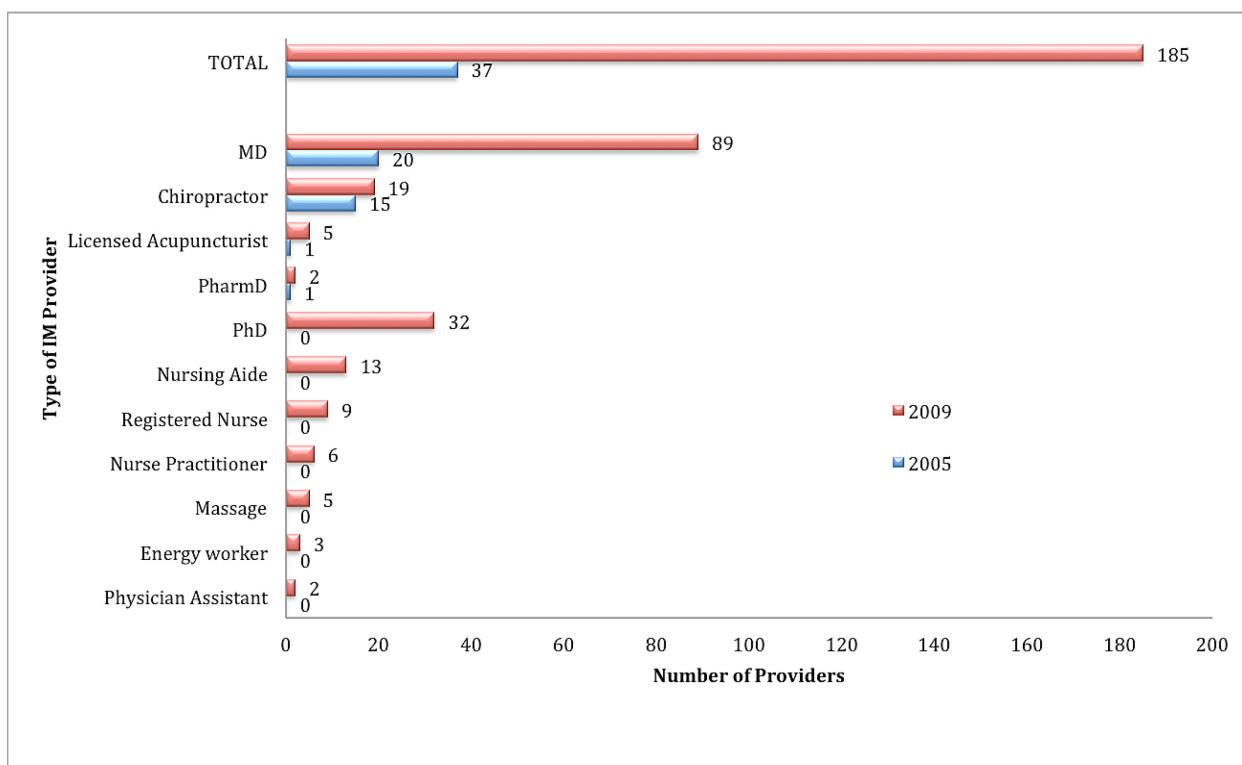
There was only one facility with a dedicated Center for Integrative Medicine in 2005 and 2009. All remaining facilities offer the IM services with other traditional practices such as Family Practice, Physical Medicine and Rehabilitation, Pain Management or Internal Medicine.

There was a 400% increase in the number of individual providers providing IM services over the study period (37 in 2005; 185 in 2009) (Figure 4-2).



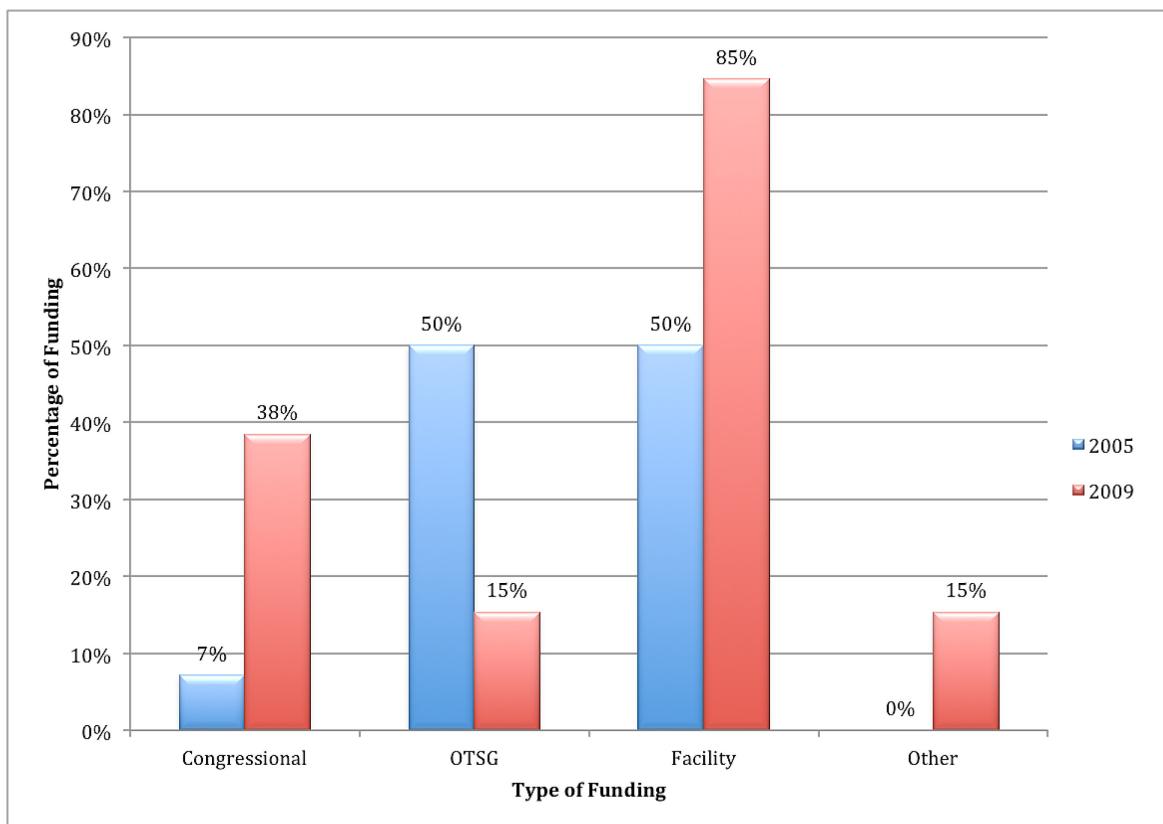
**Figure 4-2: Changes in Integrative Medicine Provider Types at Selected U.S. Department of Defense Facilities from 2005 to 2009.**

The most common provider types were Medical Doctors in both 2005 and 2009. The provider types that had the largest increase were Medical Doctors (69), PhDs (32) and Nurse Aides (13). There were 7 additional provider types that offered services from 2005 to 2009. This included PhDs, Nurse Aides, RNs, Nurse Practitioners (NP), massage therapists, energy workers and physician assistants (Figure 4-3).



**Figure 4-3: Changes in Medical Provider Types at Selected U.S. Department of Defense Facilities from 2005 to 2009.**

The funding sources for the provision of IM services changed over the study period. In 2005, there was an equal contribution (50%) of funding from The Department of Army Office of the Surgeon General (DA OTSG) and local facility budget with 7% received from Congressional sources. In 2009, Congressional and local facilities' source of funding increased by 438% and 69% respectively with a decrease in DA OTSG funding by nearly 70% (Figure 4-4).



**Figure 4-4: Changes in Integrative Medicine Funding Sources at Selected U.S. Department of Defense Facilities from 2005 to 2009.**

The number of facilities actively researching IM practices doubled from three to six over the study period.

## 4.5 DISCUSSION

Recent studies show that up to 42% of the American population is using CAM [5]. In contrast, at a single Military Medical Treatment Facility, 81% of Military beneficiaries were using Complementary and Alternative Medicine (CAM) [13]. The Department of Veterans Affairs in collaboration with the HAIG (Healthcare Analysis and Information Group) showed 88% of the VHA facilities use IM services either on site or by referral [11]. Our study showed surprising results with 93% of surveyed Department of Defense (DoD) facilities offering IM services. In the more recent study, the most common services offered were acupuncture, biofeedback, nutritional counseling and spiritual healing. The design was a formatted telephonic survey of the Deputy Chief for Clinical Services or equivalent on the available IM services within their facility. The limitation of this method is that the DCCS or equivalent could not validate their assessment of their facilities' utilization with a simple telephonic query. A better method of study would have been to have the DCCS query their facilities to verify the information for the study and submit their facilities results. In 2009, there were 11 distinct provider types providing IM services. This can lead to challenging situations. As an example, several provider types can perform acupuncture treatments; however, not all have the same level of credentialing and privileging. The Departments of the Defense Services (Navy, Air Force and Army) as well as the Veterans Affairs are developing such standards for acupuncture as well as for other IM provider types and modalities. Importantly, consensus

between the DoD Services and the VA needs to be obtained to ensure consistency and standardization across similar government agencies. This will assist in policy development, which is acceptable to all stakeholders. Additionally, since few locations are engaged in IM research, there needs to be more emphasis on and funding for more research in the field of IM. A central clearinghouse or agency can provide oversight to prevent duplicity in research efforts, encourage multi-site endeavors as well as target specific needs of the Military population. A recent DOD study showed that the Military population is actively using supplements to increase their physical performance and well-being [16]. Therefore, it is of great importance that there is a consistent and a collaborative research effort on IM services, particularly those used by Active Duty personnel, because the use of IM can be and is often patient driven. Patients will use IM even at their own out-of-pocket costs. Therefore, they may not choose safe options but rather opt for the latest trends and fads that circulate in gyms and on television commercials. This emphasizes the importance of IM research to identify safe and effective treatments.

This survey, like the HAIG survey, raises questions on the direction and goal of Military medicine with respect to IM. There needs to be oversight of provided and proposed services, privileging of practitioners, fiscal accountability, standardization of treatment and research protocols, productivity and outcome measures as well as the education of patients, practitioners and the overall community. In January 2014, the United States Defense Health Agency published the report “Integrative Medicine Health System Report to Congress”. The report showed 120 (29% of 421) Medical Treatment Facilities (MTFs) offer 275 CAM programs. Further, it showed that during the Calendar Year (CY) 2012, Active Duty Military members used 213, 515 CAM patient visits. The most frequent visits were for chiropractic care (73%) and acupuncture treatments (11%). The most common CAM programs were acupuncture, clinical nutrition and chiropractic care. The overall recommendations of the report were:

- 1) The Military Health System (MHS) will evaluate CAM programs for safety and effectiveness as well as cost-effectiveness.
- 2) The MHS consider widespread implementation of cost-effective CAM programs meeting guidelines for safety and effectiveness [4].

Other areas of study are the specific usage of IM by Military beneficiaries and the behaviors and perspective towards IM services by Military beneficiaries and the leadership. Additionally, these types of study should be repeated at regular intervals to track IM services and identify developing trends.

## 4.6 CONCLUSIONS

These two studies from 2005 and 2009 established an initial baseline of Complementary and Alternative (CAM) services within selected Department of Defense (DoD) Military Treatment Facilities (MTF). From 2005 through 2009 there has been a steady increase in the number of IM services available in the selected DoD medical treatment facilities. In 2009, the study showed that 100% of the surveyed facilities offer IM services with 92% offering six or more modalities. Nearly all facilities offer such services in concert with other traditional practices such as Family Practice, Physical Medicine and Rehabilitation, Pain Management or Internal Medicine. One facility had a dedicated Center for Integrative Medicine. Six facilities were actively researching IM practices. There is no central proponent in the area of IM services within the DoD thus suggesting the need for a leadership position. It is essential that the medical community provide safe and effective treatments by providing oversight of IM services, collaboration of research, credentialing of practitioners and establishment of educational programs. A follow up survey of all the DoD MTF is currently ongoing.

## 4.7 RECOMMENDATIONS

This study suggests the need for a routine comprehensive survey of participating North Atlantic Treaty Organization (NATO) Nations. This survey could be performed individually or as part of a collaborative effort. The results will assist in the identification of trends, best practices, perspectives and potential further endeavors in the integration of Integrative Medicine into the NATO Military healthcare systems. Additionally, a NATO-based study will open the potential for cross-NATO collaborative research, clinical practices and educational opportunities. Finally, the usage of IM services by Military individuals must be investigated.

## 4.8 REFERENCES

- [1] Baldwin, C.M., Long, K., Kroesen, K., Brookes, A.J. and Bell, I.R. A profile of military Veterans in the southwestern United States who use complementary and alternative medicine: implications for integrated care. *Arch Intern Med.* 2002 August 12-26;162(15):1697-704.
- [2] Barnes, P.M., Powell-Griner, E., McFann, K. and Nahin, R.L. Complementary and alternative medicine use among adults: United States, 2002. *CDC Advance Data from Vital and Health Statistics.* 2004 May; (343):1-19.
- [3] Department of Veterans Affairs, Veterans Health Administration, Office of the Assistant Deputy Under Secretary for Health for Policy and Planning, Healthcare Analysis and Information Group. Complementary and Alternative Medicine. Washington, DC, USA, 2011. [Internet]. [www.research.va.gov/research\\_topics/2011cam\\_finalreport.pdf](http://www.research.va.gov/research_topics/2011cam_finalreport.pdf). Retrieved April 24, 2015.
- [4] Defense Health Agency. (2014) Integrative Medicine in the Military Health System Report to Congress (DHA) Washington, DC, USA: DHA. [Internet]. <http://tricare.mil/tma/congressionalinformation/downloads/Military%20Integrative%20Medicine.pdf>. Retrieved on 9 September 2014.
- [5] Eisenberg, D.M., Davis, R.B., Ettner, S.L., Appel, S., Wilkey, S., Van Rompay, M. and Kessler, R.C. Trends in alternative medicine use in the United States, 1990 – 1997: Results of a follow up national survey. *JAMA.* 1998;280(18):1569-1575.
- [6] Eisenberg, D.M., Kessler, R.C., Foster, C., Norlock, F.E., Calkins, D.R. and Delbanco, T.L. Unconventional medicine in the United States: Prevalence, costs, and patterns of use. *N Engl J Med.* 1993 January;328(4):246-52.
- [7] George, S., Jackson, J.L. and Passamonti, M. Complementary and alternative medicine in a military primary care clinic: a 5-year cohort study. *Mil Med.* 2011 June;176(6):685-8.
- [8] Goertz, C.M., Long, C.R., Hondras, M.A., Petri, R., Delgado, R., Lawrence, D.J., Owens, E.F. and Meeker, W.C. Adding chiropractic manipulative therapy to standard medical care for patients with acute low back pain: results of a pragmatic randomized comparative effective study. *Spine.* 2013 April 15; 38(8): 627-34.
- [9] Goertz, C.M., Niemtzow, R., Burns, S.M., Fritts, M.F., Crawford, C.C. and Jonas, W.B. Auricular acupuncture in the treatment of acute pain syndromes: A pilot study. *Mil Med.* 2006 October; 171(10): 1010-4.

- [10] Kent, J.B. and Oh, R.C. Complementary and alternative medicine use among military family medicine patients in Hawaii. *Mil Med*. 2010 July;175(7):534-8.
- [11] Klemm Analysis Group. Alternative medicine therapy: assessment of current VHA practices and opportunities. Washington, DC: Klemm Group; 1999.
- [12] Kroesen, K., Baldwin, C.M., Brooks, A.J. and Bell, I.R. US military veteran's perceptions of the conventional medical care system and their use of complementary and alternative medicine. *Fam Pract*. 2002 February;19(1):57-64.
- [13] McPherson, F. and Schwenka, M.A. Use of Complementary and Alternative Therapies among Active Duty Soldiers, Military Retirees, and Family Members at a Military Hospital. *Mil Med*. 2004 May; 169(5): 354-7.
- [14] National Center for Complementary and Alternative Medicine (NCCAM). [Internet]. <https://nccih.nih.gov/health/integrative-health>. Retrieved on 7 May 2015.
- [15] Office of The Army Surgeon General. Pain Management Task Force Final Report May 2010. Providing a Standardized DoD and VHA Vision and Approach to Pain Management to Optimize the Care for Warriors and their Families. [Internet]. [http://www.regenesysbio.com/pdfs/journal/pain\\_management\\_task\\_force\\_report.pdf](http://www.regenesysbio.com/pdfs/journal/pain_management_task_force_report.pdf). Retrieved on 7 May 2014.
- [16] RTI International. Department of Defense Survey of Health Related Behaviors Among Active Duty Military Personnel A Component of the Defense Lifestyle Assessment Program (DLAP) 2005 Washington DC, USA. [Internet]. <http://prhome.defense.gov/Portals/52/Documents/RFM/Readiness/DDRP/docs/2009.09%202008%20DoD%20Survey%20of%20Health%20Related%20Behaviors%20Among%20Active%20Duty%20Military%20Personnel.pdf>. Retrieved on 7 May 2014.
- [17] Smith, T.C., Ryan, M.A. and Smith, B. et al. Complementary and alternative medicine use among US Navy and Marine Corps personnel. *BMC Complement Altern Med*, 2007 May 16;7:16.
- [18] Tindle, H.A., Davis, R.B., Phillips, R.S. and Eisenberg, D.M. Trends in Use of Complementary and Alternative Medicine by US Adults: 1997 – 2002. *Altern Ther Health Med*. 2005 January/February;11(1): 42-49.
- [19] White, M.R., Jacobson, I.G., Smith, B., Wells, T.S., Gackstetter, G.D., Boyko, E.J., Smith, T.C. and Millennium Cohort Study Team. Health care utilization among complementary and alternative medicine users in a large military cohort. *BMC Complement Altern Med*. 2011 April 11;11:27.

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## Chapter 5 – INTEGRATIVE HEALTH AND HEALING PRACTICES SPECIFICALLY FOR SERVICE MEMBERS: SELF-CARE TECHNIQUES

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### **ABSTRACT**

*There has been an ever-increasing utilization of Integrative Medicine (IM) by patients to manage their health. Dissatisfaction with depersonalized care is one of the significant factors causing patients to seek alternative means to meet their healthcare needs. These patients are often motivated to find care that coincides with their beliefs, values, and expectations. Medical healthcare systems must understand these concerns and work collaboratively with patients to achieve optimal outcomes and satisfaction levels. Self-care programs, when part of holistic treatment plans, are well-suited to address these concerns. This article discusses the concepts of self-care, active and passive participation, as well as briefly examining some IM modalities that can be used as self-care techniques. This overview describes the history, concepts, uses, and relevant research of several IM modalities and their applications as self-care techniques. Recommendations for educational and clinical “next steps” are provided. IM self-care techniques can be incorporated effectively and safely into holistic treatment plans for North Atlantic Treaty Organization (NATO) Service Members. Additional education, international collaboration, and research are necessary to improve the use of these techniques throughout the medical healthcare system.*

**Keywords:** Complementary and Alternative, Culture, Historical Perspective, Integrative Medicine, Society.

### **5.1 INTRODUCTION**

In the past 20 years, there has been increasing acceptance of Complementary and Alternative Medicine (CAM) or Integrative Medicine (IM) for treating a growing number of conditions. Data show that > 50% of the Military population, including dependents, has used CAM interventions in recent years, and up to 66% of active-duty

personnel use dietary supplements [3], [10], [20], [23], [31], [53]. Reviews of self-reporting population surveys suggest that Military personnel may be utilizing CAM services independent of conventional medical health services [12]. Furthermore, the U.S. Military encourages individuals to take charge of their own health and to improve outcomes, while minimizing utilization of limited and costly services [22]. Service Members try to avoid prescription medications because of the side-effects and the potential negative impacts on Service Members' lives and their careers, especially prescription medications used to treat pain and stress. Service Members are utilizing an increasing number of IM modalities – such as prayer for one's own health, massage therapy, and relaxation techniques – often at out-of-pocket cost [23].

Active-duty individuals may use IM either by prescription or, more frequently, without any medical supervision, to increase stamina, performance, and operational capacity; to alleviate chronic pain; or to cope with stress-related disorders [24], [26].

For the Military leadership and healthcare professionals in charge of this special population, it is critical to acquire a better knowledge of these IM interventions and the potential impact of the use of these modalities on Military medical services. Furthermore, it is imperative that healthcare providers know all the treatments their patients are utilizing. Patient and provider must work as a team to optimize the patient's care plan, expected outcomes, and levels of satisfaction.

## **5.2 UNDERSTANDING IM FOR NATO FORCES ON THE LARGER STAGE**

North Atlantic Treaty Organization (NATO) forces are continuously deployed globally for various purposes, and medical care is a necessary component of those missions. Given that this care is provided in a multi-national setting, it is crucial that medical personnel understand the systems used by each of the NATO participating Nations; this is particularly true regarding IM practices, because these can vary widely from country to country. Important cultural, medical, and financial factors must be considered.

Individuals, as well as each Nation's medical system, have diverse cultural expectations regarding necessary and appropriate care. Effective medical care is dependent upon having sensitivity to these differences. An IM modality may be considered standard care in one country while not even being recognized as a legitimate option in another country. NATO, as a multi-national organization, can serve as a forum for an expansion of ideas and understanding among differing Nations. Cooperative partnerships among countries as well as between allopathic (Western) and non-allopathic (Eastern) practitioners are imperative. National partnerships can set the foundation for this to occur, both within NATO as well as on the global stage. Multi-stakeholder education on the perspectives, potential benefits, limitations, and roles each system of care has to offer must be emphasized.

Often, healthcare “programs are primarily funded by government subsidies and administrated by a multi-tiered bureaucracy. Thus, any action undertaken in a public health program tends to be reactive, conservative and well-documented” [21]. Compounding this, increasing medical costs are having a deleterious effect on the sustainability of the system and resulting Military readiness. The addition of IM practices may provide cost-effective solutions to this problem. Improvements to the world's healthcare systems would benefit both the individual and the collective whole. The NATO Task Force can be a key to “opening the door” to achieve improved global health and healing.

### 5.3 IM AS A PRACTICE FOR SELF-CARE: THE SHIFT TOWARD EMPOWERMENT

Delivery of healthcare must be congruent with societal and individual beliefs and value systems to be effective [4], [29]. Otherwise, it is an oppressive and irrelevant system imposed upon its recipients. This is a basis for the concept of patient- or person-centered healthcare [15], [25]. Furthermore, to be effective, the care must be acceptable and easy for patients to use.

Many aspects of IM support the person-centered care model. These include:

- 1) Emphasis on individuality;
- 2) A holistic perspective (toward the individual as well as with respect to treatments);
- 3) Empowerment of the patient;
- 4) A premise of self-healing, self-influencing, self-care, and self-awareness;
- 5) Listening and partnerships;
- 6) Exploring new models of disease;
- 7) Illness, health and healing (energetics);
- 8) Emphasis on healing and health rather than on symptom management or merely obtaining a cure; and
- 9) Understanding the concept of “functional diseases” instead of disease-based diagnostic categories [37].

This premise of the “body heals itself” goes beyond simply allowing a cut to heal or a cold to resolve without treatment, but rather, it is the inherent ability of each individual to *affect* how the body heals. How people perceive themselves and the degree to which they participate in this perception greatly affects the outcome. Thus, individuals need to participate in their own care, with guidance from the healthcare community, rather than having total reliance on practitioner-dependent practices.

Self-care techniques provide a source of *doing* by patients instead of *having something done* to them. In the U.S. Army Surgeon General’s Task Force report on pain management, IM modalities were described in terms of passive and active participation [41]. Active participation is defined as the patient’s active involvement in his or her own care by participating in both the care plan and treatment. An example of active participation is performing yoga for chronic low-back pain. In contrast to merely taking medication that might deliver analgesia, the patient practicing yoga takes an active step to adopt a new practice to heal the body in a truly empowering way, and is an active participant in the treatment delivery and lifestyle change. Conversely, in the passive-participation model, patients have treatment performed on them or medications prescribed to cure isolated symptoms with very minimal participation on the patients’ part (swallowing a pill). The use of prescriptions is an example of provider-based care, which is largely passive therapy. Effective medical care can be optimized through the use of both active and passive participatory treatments. When the opportunity for active participation is available, it should be encouraged.

Use of active treatments leads to patient empowerment and personal responsibility for health and healing. In 2014, a Working Group (WG) led by the Samueli Institute performed a systematic review of Active self-care Complementary and Integrative Medicine (ACT-CIM) therapies. One of the findings of the WG was that incorporating ACT-CIM into healthcare plans improves outcomes and quality of life; allows for more diverse, patient-centered treatment; promotes self-management; and is relatively safe and cost-effective [13].

Patient participation, empowerment, and responsibility are as important in any healthcare system as technological, pharmaceutical, and surgical advancements.

It must be emphasized that the trend among Service Members to seek treatment options beyond the care they are provided within the Military healthcare system does not necessarily imply a desire for active participation or patient empowerment. Rather, it should alert the medical community to potential problems and gaps within the existing system that lead patients to become dissatisfied with it and bypass it to achieve their goals. Moreover, Service Members' motivations may include avoiding necessary care, pursuing fad regimens, or seeking drugs (pain management) or performance-enhancement (body-building supplements).

## **5.4 ROLE OF SPECIFIC IM PRACTICES FOR NATO FORCES**

The discussion about self-care active techniques includes two types. First, there are techniques that require some certified-provider instruction to initiate treatment (e.g., acupressure), following which a patient may continue without provider assistance. The second type involves techniques that do not require provider certification, but can be self-taught or performed with an assistive aid such as a Digital Versatile Disc (DVD), Compact Disc (CD), or other device (e.g., guided imagery). However, within this group of techniques, provider instruction could be beneficial (e.g., for yoga), as it may facilitate safe, effective use of the techniques, and lower the risk of injuries.

Several modalities are described briefly in the sections below, including relevant research as available. Each practice is either presented as an individual technique or in broad categories to enable ease of understanding this article, as some practices cross multiple categories. Finally, it must be emphasized that self-care should *supplement or augment*, not *replace* appropriate provider-based care.

### **5.4.1 Acupuncture and Acupressure**

Acupuncture is an ancient Chinese healing technique in which the stimulation of specific points along meridian channels in the body is achieved by piercing the skin with needles in order to enhance the flow of energy, cure disease, relieve pain and stress, and regulate the body. Acupressure achieves the same health benefits through the application of pressure at the same acupuncture points, but without needle insertions. Both disciplines require education about the point locations and the benefit(s) of stimulating the specific points. Although, as comprehensive systems of care, both are practitioner-dependent modalities, simple acupressure regimens can be taught to patients as self-care treatments.

For example, the application of pressure to the area between the thumb and index finger (Figure 5-1), known as Large Intestine 4 (LI 4), is often effective for treating headaches. Patients with migraine headaches could benefit from the practice of acupressure in the time periods between clinical appointments for maintenance and acute exacerbations. Use of acupressure as a self-care modality can be considered to be safe with minimal-to-no side effects (as long as acupressure is avoided in areas of infections, fractures, lesions, etc.) Current research on acupressure is limited; however, there are some compelling data on the benefits of acupuncture for pain relief. Research on acupuncture for neck and low-back pain has shown some clinically significantly short-term benefits, ranging from 26% – 80% effectiveness. The data are encouraging for headaches as well [9], [18], [27], [47], [50], [54]-[56].



**Figure 5-1: Location of the LI 4 Acupressure Point Often Used for the Treatment of Headaches.**  
Photograph by Richard Petri, Jr. © Photos by jocdoc. [www.jocdoc.com](http://www.jocdoc.com).

One effort, the Acupuncture Training Across Clinical Settings (ATACS) program, is a current initiative within the U.S. Department of Defense and Veterans Affairs. The goal of the initiative is to develop, pilot, evaluate, and implement a uniform tiered acupuncture education and training program for the healthcare providers of the Military Health System and Veterans Health Administration. The overarching goal is to increase capacity and access to standardized acupuncture treatments. ATACS programs train healthcare providers of various types, from medical aides to medical doctors, in Battlefield Acupuncture (BFA; See, in this report, Niemtzow, Belard and Nogier: “Battlefield Acupuncture in the US Military: A Pain Reduction Model for NATO”, pp 6.1 – 6.8) and provides for medical acupuncture training for a select group.

In 2010, the U.S. Army Surgeon General’s Pain Management Task Force Report was published and used as the basis for the Comprehensive Pain Management Campaign Plan (CPMCP) [2]. As a result of the CPMCP, Interdisciplinary Pain Management Centers (IPMCs) were developed at the Army’s medical centers. These IPMCs are designed to provide a holistic pain-management approach, which includes acupuncture delivery by providers trained in BFA as well as by licensed (LAc) and medical acupuncturists.

Both the ATACS program and the IPMCs can serve as models for acupuncture implementation for NATO troops and beneficiaries, as experiential and outcomes data are gathered. An easy first step could be development of a cadre of BFA trainers who can educate and train individuals within the various NATO medical systems. Furthermore, education of individuals in simple acupressure regimens may provide patients with easy-to-use, quick, self-care treatments to address conditions such as pain, stress, and anxiety.

#### **5.4.2 Biofeedback**

Biofeedback is the technique of utilizing an individual’s biologic/physiologic information or processes to alter those same processes. There are several types of biofeedback, based upon the types of information or processes that are being monitored. Brainwaves are monitored in Electroencephalographic (ECG) biofeedback; Electrocardiographic (EKG) biofeedback focuses on cardiovascular parameters, such as heart rate, blood pressure, and ECG/EKG data.

Biofeedback was first studied in animal models to evaluate involuntary responses and determine if animals could control those responses. This has since been expanded for use with humans. Most biofeedback is performed in specialized treatment centers or facilities. Positive modification of numerous conditions has been shown to occur with biofeedback. These include, but are not limited to, hyperarousal conditions, hypertension, [1] headaches, [6], [30] and chronic pain [28].

Recently, self-administered biofeedback techniques have become available for individuals. These require minimal instruction. The most simple of these is the use of thermal dots that sense changes in the temperature of the skin. Skin temperature is dependent upon blood flow through the capillaries. Cooler skin temperature reflects an increased level of anxiety and stress, whereas warmer skin temperature reflects relaxation and calmness. The scientific reasoning behind this phenomenon is that as the body relaxes, the blood capillaries dilate, resulting in increased blood flow. This increased flow leads to increased surface temperature. (A 1960's fad that utilized this concept was mood rings.)

Another self-administered biofeedback technique is related to Heart Rate Variability (HRV). The heart "pumping" is described as the Heart Rate (HR), which is typically expressed in beats per minute. The HR varies in response to many factors, such as physical activity. The beat-to-beat variability of the heart rate is known as the Heart Rate Variability (HRV), which is affected by the information the heart receives from various inputs, and is correlated with overall health. The autonomic nervous system controls the "fight-or-flight" response through the sympathetic and parasympathetic sub-systems. The balance of these two systems affects the HRV. The HRV can be monitored with simple devices attached to a person's finger. Computerized programs assist patients to alter HRV through respiratory patterns and thought control, thereby inducing a Relaxation Response (RR), which optimizes HRV [42], [44].

Both of these self-administered techniques are typically used in conjunction with other IM techniques, such as meditation and imagery as part of self-care programs for stress management and pain control. Sophisticated computer programs have been developed that use "video games" in which the participants learns to evoke the RR by altering the "game". In the "game" the participant uses the biofeedback techniques to raise helium balloons, race cars on a track and ski down a mountain side. More complicated games adjust the level of difficulty according to the degree of relaxation achieved.

#### **5.4.3 Energy Practices**

Energy medicine is an emerging field of science. Although people are aware of energy as the source that powers lights, computers, and just about everything in daily life, few people are aware of the energy fields that are detectable in living organisms. In this context, "energy can refer to familiar and easily measurable frequencies of the electromagnetic spectrum such as light (including color) and sound or to less-familiar influences of living systems for which measurement is currently more difficult". [48].

Many energy-based practices and techniques, such as acupuncture, deal with these less-familiar subtle energies. Different cultures refer to this energy by different names. In Traditional Chinese Medicine it is known as *Qi* or *chi*, the "vital energy". In Japanese tradition, it is *ki*, "life energy". In the Indian culture, energy is referred to as *prana*, the Sanskrit word for *life force*. The basic principle of all energy practices is that disease is the result of an imbalance in the energy. Healing is achieved through balancing the energy, using the specific practice [48].

Energy practices that can be used as self-care to balance energy in the body include Qigong, Reiki, therapeutic touch, and Pranic healing. All include practitioner- or media-based education to begin self-care programs.

Qigong combines movement with meditation for self-healing or balancing of one's energy. Through practice, the individual develops awareness of the body's energy and, through Qigong, can redirect and balance it [46].

Reiki, Pranic healing, and therapeutic touch are examples of instructor- or practitioner-dependent modalities. That is, these treatments require a provider to treat the patient. While these modalities require the provider to have specialized training and certification in the entire array of techniques, the provider can educate the patient in simple, related self-care regimens to utilize between treatment sessions. In this way, the patient can be empowered through the instruction of simple, effective healing techniques.

#### **5.4.4 Herbal Medicine and Supplementation**

Individuals are using supplements and herbals at an ever-increasing rate [19]. In the United States alone, more than half of all healthcare consumers are estimated to have used herbs, herbal preparations, or natural-product supplements alone or with conventional medicines [35]. Approximately 80% of the world's people use phytomedicine as their primary form of healthcare [35]. Often times, this use is not disclosed to providers, especially when the goals are weight reduction, increased physical and mental performance, or muscular development. Individuals often accept advice on what to take from friends rather than from reliable experts in the field.

Access to nutritional supplements and herbal products is available at grocery and specialty stores, on Internet websites, and in underground markets. In most countries, prescriptions are not necessary for purchase and the industry is unregulated or minimally regulated. Research in the field is often limited and of poor quality. Therefore, there are safety concerns with purity, standardization, toxicity, interactions, side effects, and legality. Approximately 75% of all conventional medicines are derived from living plants, [35] as are herbal remedies, and it is not uncommon to find that "natural" remedies are adulterated with active drugs [40], [45], [49].

The topics of dietary supplements and herbal remedies need to be addressed by a separate NATO Task Force, as these subjects are too large and complex for the IM Task Force to address. Under a grant from Samueli Institute, funded by the U.S. Army Medical Research and Materiel Command (MRMC), the RAND Corporation assembled an expert panel to discuss the regulation of dietary supplements in the Military in 2008 [10]. Among the recommendations the Panel produced were:

- The need to assess safety in the contexts within which supplements are being used;
- The need for evidence-based reviews of dietary supplements of particular safety concerns; and
- Production and dissemination of educational materials to provide information on supplement safety.

Medical communities need to begin honest dialogues with their patients regarding the significant use of supplements and herbals, the lack of adequate research on the risks and benefits of such use, and the impact of inappropriate use. International collaborations are necessary because countries are at varying stages with regard to knowledge databases and regulation.

#### **5.4.5 Meditative Practices (Mindfulness, Meditation, and Imagery)**

Meditative practice is a term for an expansive category of many techniques. All have a fundamental basis in the principle of directing one's awareness to the present. In life, it is impossible to avoid stress; therefore, the only control people have is the ability to change their perceptions of that stress when it comes and to find ways to cope with it. Mindfulness allows a person to focus on the absolute present moment and away from a stressful

event or other stressor. A popular analogy is looking up to the sky; rather than paying attention to the clouds, in mindfulness, the “attention” is focused on the blue space between the clouds, while acknowledging the existence of the clouds. An event or a stressor can be likened to a cloud. One can recognize that the stressor exists, but the attention does not need to remain with it. More importantly, one can learn not to attach oneself to the stressor cognitively or emotionally, which so often occurs. In doing so, less emphasis is placed on the event or stressor and more emphasis is focused on simple acknowledgement and “letting go”. This results not only in a change of perspective but, as described by Benson in his landmark study on the Relaxation Response (RR), mindfulness also has a profound effect on physiologic and psychologic well-being [5].

One of the misconceptions of meditation is that it is too difficult to practice. People often make excuses, such as “I just can’t get it right”, or “I can’t relax”. The point of meditative practices is not to achieve some particular aim; rather, the goal is to train oneself to focus on the moment. Like many important behaviors, success at meditation improves with practice. Moreover, meditation can take on various forms, and each person’s success at it is tied to the relevance of the form and acceptance of the particular behaviors it requires. For example, it takes all of one’s focus on the present to bench-press effectively and safely. Therefore, weight lifting can be a form of meditation for some people. When it is understood that many of the focused activities we engage in on a regular basis are really types of meditative practice, the impression that it takes years of practice and the skills of a yogi to appreciate the benefits of meditation (a potential stressor in itself) becomes less burdensome. The key message to patients is: “Just start”.

Meditative practices can be used to ease numerous conditions. Pain and stress-related disorders including post-traumatic stress disorder and traumatic brain injury are especially pertinent areas for NATO populations. There is an abundance of web- and media-based resources available as assistive materials that enable self-care practices. Numerous organizations and corporations offer educational and practice materials. In addition, Militaries have developed their own programs related to meditative practices for their Service Members and beneficiaries.

#### **5.4.6 Movement Practices (Exercise, Running, Yoga, T'ai Chi, and Martial Arts)**

Movement is fundamental to life. The human body is designed to move. In the words of Hippocrates, “all parts of the body which have a function, if used in moderation and exercised in labours in which each is accustomed, become thereby healthy, well-developed and age more slowly, but if unused and left idle, they become liable to disease, defective in growth, and age quickly” [17].

Within Military systems, physical activity is a necessary part of training. Over the past decade, more activities that are regarded as IM modalities are being integrated into Military training programs. These include *t'ai chi*, Taekwondo, and jujitsu, as well as mindfulness meditation and yoga [8], [11], [14], [36]. The “warrior” aspects of these practices make them more accepted by Service Members.

Yoga is an ancient practice of linking mind, body and spirit through a combination of postures, breathing, and conscious relaxation and meditation. Derived from the Sanskrit word meaning, *yoke, constellation, conjunction or union*, *yoga* is the integration of physical, mental, and spiritual energies that enhance health and well-being [34]. Yoga, as practiced in India, is truly a lifestyle composed of physical, spiritual, and nutritional aspects.

Yoga is not so widely accepted within the Military framework, in part, because of yoga’s religious origins. Service Members may be less willing to try an active-participation healing method that is strongly associated with differing religious views from their own views. To remedy this, the movements, poses, and exercises have been separated from the Eastern religious concepts and introduced under alternate names, such as “warrior

breathing”. This may increase the acceptance of yoga as being beneficial and consistent with promoting Military readiness, without the need to embrace a particular religious philosophy. In general, yoga in the West is seen more as one of many exercise programs, with numerous gyms, spas, and rehabilitation centers offering instructional classes.

Instruction in yoga can be provider- or media-based and then practiced as a self-care technique. The IPMCs within the U.S. Department of the Army offer yoga for treating pain conditions. The yoga taught at the IPMCs is primarily Hatha yoga. As initially developed, Hatha (*force*) yoga uses body-strengthening and physical-purification techniques as means of self-transformation and transcendence and, ultimately, to clean and improve the condition of various physical organs.

All of the movement-oriented self-care techniques require provider instruction to learn proper techniques and forms. There is risk of injury if these are performed incorrectly or if there is a contraindication for the patient’s condition. As an example, a person with a herniated disc should not perform forward flexing movements because of an increased risk of exacerbating or furthering the injury with forward flexion. Therefore, provider guidance is essential – both at the initiation of practice as well as through monitoring of the program.

Research on the benefits of exercise and movement programs is well-established [51] and the World Health Organization embraces a global strategy “to promote and protect health through healthy eating and physical activity” [57]. If performed properly, movement self-care programs offer benefits to cardiopulmonary, musculoskeletal, and immunologic systems as well as a heightened sense of well-being, increased overall Quality of Life (QoL), and improved human health and flourishing.

#### **5.4.7 Rituals, Spirituality, and Religiosity**

The areas of spirituality and religiosity can be provocative and controversial; however, there are sufficient data to suggest growing evidence for the correlation between religious and spiritual participation and health [43]. In addition, data show a growing positive association between pain and prayer use for health concerns [32], [52]. Therefore, these areas warrant inclusion as self-care techniques.

Rituals are defined as enactments based on cultural beliefs and values. These can be social (celebration of a special event such as a birthday or national independence), Military (changing of command ceremonies), religious (prayer, mass), or spiritual (prayer, gratitude) [33].

Spirituality “refers to the transcendental relationship between a person and a higher being, a quality that goes beyond a specific religious affiliation”. The word spirituality is derived from the Latin *spiritus*, which means breath, and is related to the Greek word *pneuma*, which refers to the vital spirit or soul [33]. Spirituality is a complex and multi-dimensional construct, and can be defined as an open and individual experiential approach in the search for meaning and purpose in life (“content”).

Religion is an institutional and culturally determined approach, which harnesses this essence and organizes the collective experiences of people (faith) into a closed system of beliefs and practices (form) [7]. The reader is referred to an article in this report, entitled “*Spirituality/Religiosity as a Resource for Coping in Soldiers: A Summary Report*” pages 8-1 through 8-11, for a detailed discussion on these concepts.

Numerous research studies have shown prayer to be the most commonly used IM modality [23], [39]. Prayer has a profound effect on the healing process, even when no cure or improvement in the condition is likely. It has been explained this way:

[O]f course, we know that the faith factor is not a panacea – the mortality rate for human beings still remains 100%. But even when physical healing does not occur, some degree of improvement almost always takes place, most often a sense of peace in facing a serious illness or disability [38].

Other forms of spiritual and religious self-care techniques include experiencing gratitude, charitable works, forgiveness, hope, peace-making, and compassion, to name a few. It is the responsibility of care providers to facilitate, provide, and utilize these “techniques” together with their patients. Compassion, for example, means to suffer with. According to Viktor Frankl, a psychiatrist who wrote of his experiences in Nazi concentration camps, “man is not destroyed by suffering; he is destroyed by suffering without meaning” [16].

Care providers are responsible for helping their patients to find meaning and solace in the midst of their physical and mental pain and suffering; providers need to be more than just “someone in a white coat”, issuing orders and prescribing pills. Despite the incomplete scientific evidence about how these techniques work, it is necessary that the medical communities understand and accept that patients utilize them as part of their own healing journeys. To minimize the use of these techniques and the impact of their use would be to minimize treatment plans as wholes, and to fail to fully implement patient-centered care.

## **5.5 DISCUSSION**

What is vital to the success of healthcare is the participation of the patient in treatment. This concept of active participation is one of the key aspects of the patient-centered care model. IM philosophy, concepts, and modalities emphasize this model of care as necessary for improved outcomes. Many IM modalities can be used as self-care techniques as part of comprehensive, holistic programs. This is not to advocate that patients should depend solely upon self-care techniques for their personal care, but rather that providers, patients, and communities need to collaborate to identify the best combinations of approaches to benefit patients. The end result would be a more effective, comprehensive healthcare system that is not always provider-dependent, but instead empowers patients to share responsibility for their own health.

## **5.6 CONCLUSIONS**

Self-care practices offer patients autonomy over, empowerment regarding, and responsibility for their conditions. Many self-care techniques can be practiced safely and effectively after some provider- or media-based education. A self-care program must be incorporated into the overall healthcare treatment plan to maximize outcomes as well as the levels of satisfaction of providers and patients.

## **5.7 RECOMMENDATIONS**

NATO is well-positioned to mediate the necessary and effective collaborations of multi-nation initiatives because of the cultural diversity and knowledge of NATO’s partners. The development of a self-care handbook for Service Members and an educational handbook on the techniques for successful leadership could be a potential next step. Furthermore, the NATO Task Force on Integrative Medicine could be continued for the education about and implementation of best practices related to self-care. There needs to be consideration for international research on self-care outcomes, patient QoL measures, and performance improvement (individually or collectively as a Military organization). Finally, in the areas of herbs and supplementation, a separate NATO Task Force should be established to review prevalence, usage patterns, risks, benefits, and regulatory considerations.

## 5.8 REFERENCES

- [1] Abgrall-Barbry, G. and Consoli, S.M. [Psychological approaches in hypertension management]. *Presse Med* 2006;35(6 Pt 2):1088-94.
- [2] Arcand, S. Utilizing Integrative Medicine in the U.S. Army Medical Department: U.S. Army War College 2012. U.S. Army Medical Command Operation Order (OPORD) 10-76 (USAMEDCOM Comprehensive Pain Management Campaign Plan). Washington, DC, USA: Office of the Army Surgeon General; 2010.
- [3] Arsenault, J. and Kennedy, J. Dietary supplement use in U.S. Army Special Operations candidates. *Mil Med* 1999;164(7):495-501.
- [4] Balneaves, L., Weeks, L. and Seely, D. Patient decision making about complementary and alternative medicine in cancer management: Context and process. In: Adams J, ed. *Traditional, Complementary and Integrative Medicine: An International Reader*. London, UK: Palgrave Macmillan, 2012:71-78.
- [5] Benson, H. The relaxation response: history, physiological basis and clinical usefulness. *Acta Med Scand Suppl* 1982;660:231-7.
- [6] Buse, D.C. and Andrasik, F. Behavioral medicine for migraine. *Neurol Clin* 2009;27(2):445-65.
- [7] Büsing, A. Measures of spirituality in health care. In: Cobb, M., Puchalski, C., Rumbold, B., eds. *Oxford Textbook of Spirituality in Healthcare*. Oxford, UK: Oxford University Press, 2012:323-31.
- [8] Club Jiu-Jitsu, V.M.I. Jiu-Jitsu Club. [Internet]. [www.vmi.edu/Content.aspx?id=10737419467](http://www.vmi.edu/Content.aspx?id=10737419467), Accessed July 6, 2015.
- [9] Coeytaux, R.R., Kaufman, J.S., Kaptchuk, T.J., Chen, W., Miller, W.C., Callahan, L.F. and Mann, J.D. A randomized, controlled trial of acupuncture for chronic daily headache. *Headache* 2005;45(9):1113-23.
- [10] Coulter, I., Newberry, S. and Hilton, L. Regulation of Dietary Supplements in the Military. Rand Corporation Center for Military Health Policy Research Conference Proceedings; 2011; Santa Monica, CA, USA. Rand Corporation.
- [11] Culotti, P. Tai Chi Training for Veterans. [Internet]. [http://taichihealth.com/?page\\_id=1033](http://taichihealth.com/?page_id=1033), Accessed July 6, 2015.
- [12] Davis, M.T., Mulvaney-Day, N., Larson, M.J., Hoover, R. and Mauch, D. Complementary and alternative medicine among veterans and military personnel: a synthesis of population surveys. *Med Care* 2014;52(12 Suppl 5):S83-90.
- [13] Delgado, R., York, A., Lee, C., Crawford, C., Buckenmaier, C., 3rd, Schoomaker, E. and Crawford, P. Active Self-Care Therapies for Pain (PACT) Working Group. *Pain Med*. 2014 Apr;15 Suppl 1:S9-20.
- [14] Dong-kyun, H. U.S. Soldiers Train at World Tae Kwon Do Headquarters. The Official Homepage of the United States Army. [Internet]. [www.army.mil/article/90372/U\\_S\\_Soldiers\\_train\\_at\\_World\\_Tae\\_Kwon\\_Do\\_headquarters/](http://www.army.mil/article/90372/U_S_Soldiers_train_at_World_Tae_Kwon_Do_headquarters/), Accessed July 6, 2015.
- [15] Epstein, R.M. and Street, R.L., Jr. The values and value of patient-centered care. *Ann Fam Med* 2011;9(2):100-3.

- [16] Frankl, V. *Man's Search for Meaning*. New York: Simon & Schuster, 1959.
- [17] Freeman, L. Exercise as an Alternative Therapy. In: Freeman L, ed. *Mosby's Complementary and Alternative Medicine A Research-Based Approach*, 2nd ed. St Louis, MO, USA: Mosby, 2004:481-516.
- [18] Freeman, L. Acupuncture. In: Freeman L, ed. *Mosby's Complementary and Alternative Medicine A Research-Based Approach*, 2nd ed. St Louis, MO, USA: Mosby, 2004:333-69.
- [19] Gahche, J., Bailey, R., Burt, V., Hughes, J., Yetley, E., Dwyer, J., Picciano, M.F., McDowell, M. and Sempos, C. Dietary supplement use among U.S. adults has increased since NHANES III (1988 – 1994). NCHS data brief 2011(61):1-8.
- [20] George, S., Jackson, J.L. and Passamonti, M. Complementary and alternative medicine in a military primary care clinic: a 5-year cohort study. *Mil Med* 2011;176(6):685-8.
- [21] Giordano, J., Garcia, M. and Strickland, G. Integrating Chinese traditional medicine into a U.S. public health paradigm. *J Altern Complement Med* 2004;10(4):706-10.
- [22] Glavan, K.A., Haynes, M., Jones, D.R. and Philput, C. A military application of a medical self-care program. *Mil Med* 1998;163(10):678-81.
- [23] Goertz, C., Marriott, B.P., Finch, M.D., Bray, R.M., Williams, T.V., Hourani, L.L., Hadden, L.S., Colleran, H.L. and Jonas, W.B. Military report more complementary and alternative medicine use than civilians. *J Altern Complement Med* 2013;19(6):509-17.
- [24] Greenwood, M.R.C. and Oria, M. Use of Dietary Supplements by Military Personnel. Washington, DC, USA: National Academies Press 2008. [Internet]. <http://www.ncbi.nlm.nih.gov/pubmed/20669410>, Accessed July 6, 2015.
- [25] Guyatt, G., Montori, V., Devvereaux, P.J., Schunemann, H. and Bhandari, M. Patients at the center: in our practice, and in our use of language. *ACP J Club* 2004;140(1):A11-2.
- [26] Hammond, M. and Vandenberg, P. Complementary and Alternative Medicine. VA Healthcare Department of Veterans Affairs 2011. [Internet]. [www.research.va.gov/research\\_topics/2011cam\\_finalreport.pdf](http://www.research.va.gov/research_topics/2011cam_finalreport.pdf), Accessed April 24, 2015.
- [27] Jena, S., Witt, C.M., Brinkhaus, B., Wegscheider, K. and Willich, S.N. Acupuncture in patients with headache. *Cephalalgia* 2008;28(9):969-79.
- [28] Jensen, M.P., Gertz, K.J., Kupper, A.E., Braden, A.L., Howe, J.D., Hakimian, S. and Sherlin, L.H. Steps toward developing an EEG biofeedback treatment for chronic pain. *Appl Psychophysiol Biofeedback* 2013;38(2):101-8.
- [29] Jonas, W. Forward. In: Kelner, M., Wellman, B., Pescosolido, B., Saks, M., eds. *Complementary and Alternative Medicine: Challenge and Change*. New York, NY, USA: Routledge, Taylor & Francis, 2003:xi-xvi.
- [30] Kanji, N., White, A.R. and Ernst, E. Autogenic training for tension type headaches: a systematic review of controlled trials. *Complement Ther Med* 2006;14(2):144-50.

- [31] Kent, J.B. and Oh, R.C. Complementary and alternative medicine use among military family medicine patients in Hawaii. *Mil Med* 2010;175(7):534-8.
- [32] Kirmayer, L.J. The cultural diversity of healing: meaning, metaphor, and mechanism. *Heart views: the official journal of the Gulf Heart Association* 2013;14(1):39-40.
- [33] Koopsen, C. and Young, C. Health and the Human Spirit. In: Koopsen, C., Young, C., eds. *Integrative Health: A Holistic Approach for Health Professionals*. Sudbury, MA, USA: Jones & Bartlett Publishers, 2009:31-57.
- [34] Koopsen, C. and Young, C. Healing Effects of Physical Activity and Movement. In: Koopsen, C., Young, C., eds. *Integrative Health: A Holistic Approach for Health Professionals*. Sudbury, MA, USA: Jones & Bartlett Publishers, 2009:317-41.
- [35] Koopsen, C. and Young, C. Integrative Nutrition. In: Koopsen, C., Young, C., eds. *Integrative health: a holistic approach for health professionals*. Sudbury, MA, USA: Jones and Bartlett Publishers, 2009: 261-96.
- [36] Lynch, V. Tai Chi Classes Offered to Build Resiliency, Help Prevent Suicide. The Official Homepage of the United States Army. [Internet]. [www.army.mil/article/45441/Tai\\_Chi\\_classes\\_offered\\_to\\_build\\_resiliency\\_help\\_prevent\\_suicide/](http://www.army.mil/article/45441/Tai_Chi_classes_offered_to_build_resiliency_help_prevent_suicide/), Accessed July 6, 2015.
- [37] Maizes, V., Rakel, D. and Niemiec, C. Integrative medicine and patient-centered care. *Explore (NY)* 2009;5(5):277-89.
- [38] Matthew, D. and Clark, C. Healing the Body: Restoring Our Physical Selves. In: Matthew D, Clark C, eds. *The Faith Factor: Proof of the Healing Power of Prayer*. New York, NY, USA: Penguin Book, 1996:60-82.
- [39] Medicine, N.C.f.C.a.A. Prayer and Spirituality in Health: Ancient Practices, Modern Science. CAM at the NIH: Focus on Complementary and Alternative Medicine. 2005;XII(1):1-4. . National Institutes of Health: 2005. [Internet]. [www.jpsych.com/pdfs/NCCAM%20-%20Prayer%20and%20Spirituality%20in%20Health.pdf](http://www.jpsych.com/pdfs/NCCAM%20-%20Prayer%20and%20Spirituality%20in%20Health.pdf), Accessed July 6, 2015.
- [40] Newmaster, S.G., Grguric, M., Shanmughanandhan, D., Ramalingam, S. and Ragupathy, S. DNA barcoding detects contamination and substitution in North American herbal products. *BMC Med* 2013;11:222.
- [41] Pain Management Task Force. Pain Management Task Force Final Report May 2010. Office of the Army Surgeon General. [Internet]. [www.regenesisbio.com/pdfs/journal/pain\\_management\\_task\\_force\\_report.pdf](http://www.regenesisbio.com/pdfs/journal/pain_management_task_force_report.pdf), Accessed May 7, 2014.
- [42] Rajendra Acharya, U., Paul Joseph, K., Kannathal, N., Lim, C.M. and Suri, J.S. Heart rate variability: a review. *Med Biol Eng Comput* 2006;44(12):1031-51.
- [43] Schlitz, M. Meditation, prayer and spiritual healing: the evidence. *Perm J* 2005;9(3):63-6.
- [44] Shaffer, F., McCraty, R. and Zerr, C.L. A healthy heart is not a metronome: an integrative review of the heart's anatomy and heart rate variability. *Front Psychol* 2014;5:1040.

- [45] Snyman, T., Stewart, M.J., Grove, A. and Steenkamp, V. Adulteration of South African traditional herbal remedies. *Ther Drug Monit* 2005;27(1):86-9.
- [46] Synovitz, L. and Larson, K. Energy Medicine. In: Synovitz, L., Larson, K., eds. *Complementary and Alternative Medicine for Health Professionals: A Holistic Approach to Consumer Health*. Burlington, MA, USA: Jones & Bartlett Learning, 2013:219-29.
- [47] Thomas, K.J., MacPherson, H., Thorpe, L., Brazier, J., Fitter, M., Campbell, M.J., Roman, M., Walters, S.J. and Nicholl, J. Randomised controlled trial of a short course of traditional acupuncture compared with usual care for persistent non-specific low back pain. *Bmj* 2006;333(7569):623.
- [48] Trivieri, L. Energy Medicine. In: Trivieri, L., Anderson, J., eds. *Alternative Medicine: The Definitive Guide*, 2nd ed. Berkeley, CA, USA: Celestial Arts, 2002:201-16.
- [49] Uttam, G. and Ferguson, A. Adulteration of herbal remedies with conventional drugs: Role of the clinical laboratory. In: Dasgupta, A., Hammett-Stabler, C., eds. *Herbal Supplements: Efficacy, Toxicity, Interactions with Western Drugs, and Effects on Clinical Laboratory Tests*. Hoboken, NJ, USA: John Wiley & Sons, 2011.
- [50] Vickers, A.J., Cronin, A.M., Maschino, A.C., Lewith, G., MacPherson, H., Foster, N.E., Sherman, K.J., Witt, C.M., Linde, K. and Acupuncture Trialists, C. Acupuncture for chronic pain: individual patient data meta-analysis. *Arch Intern Med* 2012;172(19):1444-53.
- [51] Vina, J., Sanchis-Gomar, F., Martinez-Bello, V. and Gomez-Cabrera, M.C. Exercise acts as a drug; the pharmacological benefits of exercise. *Br J Pharmacol* 2012;167(1):1-12.
- [52] Wachholtz, A.B. and Sambamthoori, U. National trends in prayer use as a coping mechanism for depression: changes from 2002 to 2007. *J Relig Health* 2013;52(4):1356-68.
- [53] White, M.R., Jacobson, I.G., Smith, B., Wells, T.S., Gackstetter, G.D., Boyko, E.J., Smith, T.C. and Millennium Cohort Study, T. Health care utilization among complementary and alternative medicine users in a large military cohort. *BMC Complement Altern Med* 2011;11:27.
- [54] White, P., Lewith, G., Prescott, P. and Conway, J. Acupuncture versus placebo for the treatment of chronic mechanical neck pain: a randomized, controlled trial. *Ann Intern Med* 2004;141(12):911-9.
- [55] Witt, C.M., Jena, S., Brinkhaus, B., Liecker, B., Wegscheider, K. and Willich, S.N. Acupuncture for patients with chronic neck pain. *Pain* 2006;125(1-2):98-106.
- [56] Witt, C.M., Jena, S., Selim, D., Brinkhaus, B., Reinholt, T., Wruck, K., Liecker, B., Linde, K., Wegscheider, K. and Willich, S.N. Pragmatic randomized trial evaluating the clinical and economic effectiveness of acupuncture for chronic low back pain. *Am J Epidemiol* 2006;164(5):487-96.
- [57] World Health Organization (WHO). World Health Organization Global Strategy on Diet, Physical Activity and Health. Global Strategy on Diet, Physical Activity and Health. [Internet]. [www.who.int/dietphysicalactivity/goals/en/](http://www.who.int/dietphysicalactivity/goals/en/), Accessed July 6, 2015.

## Chapter 6 – BATTLEFIELD ACUPUNCTURE IN THE U.S. MILITARY: A PAIN REDUCTION MODEL FOR NATO

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### **ABSTRACT**

*Acupuncture originated in China more than 5,000 years ago. Battlefield Acupuncture (BFA), developed by Niemtzow, consists of treating 5 points on each ear, using semi-permanent needles to reduce pain in a few minutes. Easily taught to North Atlantic Treaty Organization (NATO) troops, this methodology can be explained in 3 hours. This article describes how the BFA technique may be taught to Military medical personnel in a few hours and may be used in a NATO medical treatment facility or battlefield environment without the necessity for patients' disrobing. Five tiny, sterile 2-mm needles are inserted into specific points of each ear. The points are:*

- 1) *Cingulate Gyrus;*
- 2) *Thalamus;*
- 3) *Omega 2;*
- 4) *Shen Men; and*
- 5) *Point Zero.*

*The needles may remain in the ears for up to 3 days. BFA produces rapid pain relief in a few minutes with almost no side effects. This is an ideal technique to use when pain has not responded to narcotics or when habit-forming drugs are not desired, especially during critical Military missions.*

**Keywords:** *Acupuncture, Auriculotherapy, Battlefield Acupuncture, NATO Acupuncture Course, Pain, U.S. Military.*

## **6.1 INTRODUCTION**

Acupuncture is a psychobiologic therapeutic modality supplementing existing care in the interrelated psychological and physical areas of trauma. Developed by the Chinese more than 5,000 years ago, acupuncture still forms the basis of medical care in China and is integrated with Western medicine in many hospitals. The Chinese invented acupuncture, and the French invented auriculotherapy, i.e., ear acupuncture.

Classically, acupuncture is described as needling specific points on an acupuncture meridian that influences the movements of Qi and has specific physiological manifestations. This movement of Qi flows in accordance to the concept of Yin and Yang; as Yang increases, so Yin decreases, and the converse is true. When movement of the Qi is blocked, illness is said to manifest [3]. Despite many attempts, modern biomedical science has been unable to prove the existence of meridians, acupuncture points, or energy Qi.

Although acupuncture points are reported to be characterized by low electrical resistance points, the literature presents various views. Histologic analysis of the acupuncture point reveals an area containing connective tissues supporting minuscule structures, nerve fibers, lymphatic and capillary vessels, and arterioles [4]. The physiologic significance of this complex is not clearly understood. Body acupuncture points are said to be permanently electrically active as opposed to auriculopoints that appear to be electrically active when disease is present and that disappear when pathology is absent. No histologic analyses of ear acupuncture points have been found in the literature by the current authors.

Despite the inability to prove the existence of acupuncture meridians and points, acupuncture is used around the world in either a primary or adjunctive mode to treat pain and other diseases. Acupuncture is nonetheless recognized as a low-risk, low-cost modality [3].

A medical technique developed and promoted by Paul Nogier, MD, in the 1950's enables treatment of pain or functional disorders by using only ear points. This technique, is known as auriculotherapy or ear acupuncture. A very precise somatotopy exists on the ear, and each organ of the body has a correspondence on the auricle [10]-[12].

Acupuncture utilization in the Military is not a new concept. During the 5,000-plus years of the history of acupuncture in China, this modality has been well-embedded into that country's Military and civilian medical cultures. As recently as the Vietnam conflict when Hanoi was cut off from Western medical supplies, Military and civilian hospitals resorted to acupuncture as a mainstream medicine. Captured North Vietnamese Military medics carried a small number of acupuncture needles and Moxa as their only medical equipment. Moxa is a plant that, when carefully ignited on an inserted acupuncture needle serves as a stimulant and may have apparent healing properties as a result of absorbed vapors through the skin.

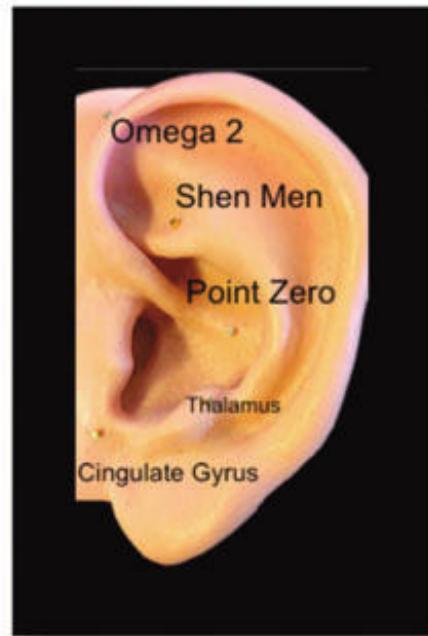
In the 1980's, acupuncture was acknowledged but not widespread in the U.S. Armed Forces. History notes that several Military physicians endeavored to practice acupuncture but it never achieved widespread popularity or acceptance. It was not until the mid-1990's that acupuncture truly gained a solid foothold in Military medical practice.

The fact that acupuncture is steadily achieving an increasingly prominent role in the U.S. Military is directly attributed to the tireless efforts and innovative approaches of the first author, a radiation oncologist, COL (ret) Richard C. Niemtzow, MD, PhD, MPH. He started the first Military acupuncture clinic at the Walson Air Force Hospital in Fort Dix, NJ, USA, in 1995. He transferred later to Edwards Air Force Base, CA, USA, and started another acupuncture clinic. The Assistant Secretary of Defense, Sue Bailey, DO, asked Dr. Niemtzow if there was any role for acupuncture in the treatment of breast cancer. In response, he presented

at a Breast Cancer Conference at the National Naval Medical Center (NNMC) in San Diego, a lecture entitled, “The Role of Acupuncture in Breast Cancer: Magic or Medicine?” [8] The presentation was so well-received that he was invited to become the first full time medical acupuncturist in the history of the U.S. Armed Forces. He was transferred as a guest of the U.S. Navy at NNMC from August 1999 to August 2002 [14]. During the summer of 2001, Dr. Niemtzow designed the well-known Battlefield Acupuncture (BFA) for acute and chronic pain relief (Figure 6-1) [6].

### **SEQUENCE OF NEEDLES (both ears)**

- 1. CINGULATE GYRUS**
- 2. THALAMUS**
- 3. OMEGA 2**
- 4. POINT ZERO**
- 5. SHENMEN**



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**Figure 6-1: Sequence of Needles (Battlefield Acupuncture) for Both Ears.**  
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Using the BFA technique, Dr. Niemtzow inserted tiny sterilized < 2-mm gold plated Acupuncture Semi-Permanent (ASP) needles developed by Paul Nogier, MD, over 30 years ago (Aiguille d’ Acupuncture Semi-Permanente, Sedatelec, Chemin des Muriers, Irigny, France) into specific points in the ear in a well-defined unique sequence of points as follows:

- 1) Cingulate Gyrus;
- 2) Thalamus;
- 3) Omega 2;
- 4) Shen Men; and
- 5) Point Zero.

Paul Nogier, MD, described all of these points except Shen Men, which was described by the Chinese) [10]-[12]. This technique achieves pain attenuation to zero or near zero in many circumstances and produces remissions of hours, days, weeks, or months depending on each patient's pathology [6].

The sterilized needles, which may be carried in the combat pocket, are easy to dispose of and may be inserted into a patient's outer ear in any environment – land, sea, or air – in < 5 minutes. The technique may be taught in a few hours to non-acupuncturists. Over the past decade of intense use by hundreds of healthcare providers, few if any side effects or ear infections have been reported. This technique is fast, portable, and rapidly deployable in any environment, and does not require patients to undress [6].

The ear is considered to be a microsystem that reflects the entire body, which is represented on the outer portion of the ear (auricle). Traditionally, pain treated by auriculotherapy utilizes known anatomical areas in the ear corresponding to body morphology [13]. For example, if a patient experiences acute or chronic back pain, needles are placed in the ear in known points that correspond to the spine. Dr. Niemtzow has used both electrical and laser stimulation on the BFA points with similar results. Laser and microcurrent electrical stimulations are appropriate for patients who fear needles (such as children).

## **6.2 MECHANISM OF ACTION**

Theoretically, when placed in the BFA points, the needles interfere with processing of pain in the central nervous system at the hypothalamus, thalamus, cingulate gyrus, cerebral cortex, and other structures [9]. Functional magnetic resonance imaging research studies from Zang-Hee Cho, PhD, and Dr. Niemtzow suggest that this is the case, and it is probable that the rapid resolution of pain may be the result of direct communication from the ear to the brain [1], [5], [7]. The exact mechanism of action is unknown.

## **6.3 TECHNIQUES**

ASP gold needles are semi-permanent needles that can remain in the ear acupoints for up to 3 – 4 days or longer before being pushed out to the skin surface by the previous flattened epidermis.

The clinician, after obtaining proper history and performing a physical evaluation of the patient's complaint of pain, initiates the BFA technique by placing the patient in a sitting position and needling, sequentially, the Cingulate Gyrus, Thalamus, Omega 2, Point Zero, and Shen Men points (see Figure 6-1). For example, a needle would be inserted into the Cingulate Gyrus point of the left ear, and then another needle would be inserted into the Cingulate Gyrus point of the right ear. After each needle placement, the patient would walk for 1 – 2 minutes. One ear would be considered dominant when the patient's pain drops 2 units on a Visual Analogue Scale (VAS) used for assessing for subjective pain. If a dominant ear is determined, the ASP needles would be continued on that ear to achieve a pain score of < 1 (on the VAS). If that is not achieved, BFA would be continued on the non-dominant ear until a total of 10 needles, 5 on each ear have been placed [6], [7].

Note that the Thalamus and Omega 2 points are classically located in the hidden areas of the ear. However, placing the needles in the external and visible areas of the ears appears to be easier and more effective [6].

The patient is allowed to ambulate for about 2 minutes to determine if pain attenuation has occurred. If no pain attenuation has occurred, an ASP needle is inserted into the Cingulate Gyrus point of the opposite ear, and the patient ambulates to determine the new pain level.

If pain attenuation  $> 0$  has been achieved via the Cingulate Gyrus point, another ASP needle is placed in the Thalamus point in the ear that has produced the most pain attenuation. The patient ambulates again, and the new pain level is determined.

ASP needles are placed in a similar sequential manner into the Omega 2, Shen Men, and Point Zero points of whichever ear produces pain attenuation. After the dominant ear has received ASP needles into all the BFA points, the patient's pain level is evaluated. If the pain level is 0 – 1/10, the therapeutic goal has been achieved. When the patient's pain level remains above 0, the contralateral ear is needled in a similar manner. The maximum number of ASP needles used in each ear is 5 [6].

## **6.4 AIR FORCE ACUPUNCTURE AND ALTERNATIVE MEDICINE CENTER**

The U.S. Air Force established the U.S. Air Force Acupuncture and Alternative Medicine Center (AFAC) at Joint Base Andrews as the only full-time acupuncture center in the Department of Defense (DoD). The purpose of the Center is to treat referred Active Duty and retired Military personnel and their dependents, and to teach acupuncture, principally BFA, to physicians and other healthcare providers in the Armed Forces. Certified BFA and BFA “Train the Trainer” courses have been established. The BFA course can be accomplished in one morning or afternoon, including practice with patients. The BFA Train the Trainer course requires that each candidate be a physician medical acupuncturist who is actively practicing acupuncture in the Armed Forces. This course is completed in either a single morning or afternoon. The candidate must teach one BFA course under supervision of the AFAC to achieve certification.

A database is kept of students who have completed both courses. Estimated costs of teaching are only \$50 per student, not including transportation, lodging, and per diem expenses if required. AFAC personnel will travel to other locations if it appears to be cost-effective to teach on site instead of requiring students to travel to the center. To date, over 1,800 students have been trained in the DoD. The number of available certified students varies, with physicians leaving the service after completing their Military obligations and/or entering retirement.

## **6.5 DISCUSSION**

Military use of the BFA technique centers on times when a narcotic cannot be used because the resultant lethargy would affect a critical mission negatively. As the ears are almost always accessible, this method is very convenient and simple to practice without undressing patients, especially during combat situations. A patient should experience a reduced pain period of minutes, hours, days, weeks, or months, depending on the pathology treated. BFA may be repeated many times. The clinician should observe the patient's ear for irritation or infection. The current authors have not noted any infections in the ears of patients. In some cases, a patient will experience healing and will have a long lasting pain-free period. Other patients who are usually older and have more complicated pathologies will not experience complete healing. The needles can take the place of pain medication. Dr. Niemtzow has found that treating a patient with ASP needles biweekly is sufficient in most cases.

The DoD and Veterans Affairs (VA), Joint Incentive Fund (JIF) recently allocated the DoD–VA \$5.4 million for BFA. This proposal obtained funding to:

- 1) Establish a uniform training program for BFA across the DoD and VA;
- 2) Train a small cadre of physicians in the DoD and VA in medical acupuncture; and

- 3) Initially establish the availability of acupuncture as an option at all levels of care throughout the DoD and VA.

This funding would also enable establishment of uniform credentialing standards and quality-assurance processes to facilitate integration of acupuncture safely into the mainstream of Military and veterans' care [2].

## **6.6 CONCLUSIONS**

BFA is a recommended technique to be promoted throughout the NATO medical system. This technique has been received very well and is in great demand by U.S. Military healthcare providers and Special Forces.

## **6.7 RECOMMENDATIONS**

Military Services members experience pain. This is independent of the Military being at war or during peacetime. For centuries, opioids have been used to treat pain conditions; this is a form of pain management that is widely continued today. Opioids' side effects may be a crippling factor with respect to Military readiness. Although, opioids have some benefit for acute pain management, habitual use of these drugs for chronic pain management has no benefit. Rather, there are serious negative effects, which include degradation of Military performance. However, there are new programs investigating new treatments and modalities for pain management.

One such project is the ongoing initiative of the U.S. Armed Forces and VA. It is a JIF program called "Acupuncture Training Across Clinical Settings" (ATACS). The goal of this program is to develop, pilot, evaluate, and implement a tiered acupuncture education and training program for healthcare providers within the DoD and VA systems, to include BFA. Despite the paucity of clinical trials in BFA use in Military populations, there is evidence that BFA may have significant benefits for treating acute and chronic pain. The preliminary data of the ATACS project combined with other studies using BFA in Military populations suggests:

- 1) BFA may help reduce and possibly replace opioid usage.
- 2) U.S. troops in Afghanistan and Iraq who had received BFA regarded it more favorably than receiving habit-forming drugs.
- 3) Physicians demand to be educated in and practice BFA.
- 4) BFA is a safe, effective treatment option that can produce rapid pain attenuation and return to duty without untoward effects.
- 5) Patients request BFA over narcotics.
- 6) BFA has been shown to have a favorable effect on operational readiness.
- 7) Long-term BFA may offer significant cost savings over narcotics.

BFA can easily be used as a primary treatment or as an adjunct to various pain modalities now practiced in NATO medical communities. It is therefore recommended that a BFA program similar to the successful program in the U.S. DoD and VA health systems be implemented as a demonstration project at several NATO bases. The project would include education of healthcare providers in BFA technique and delivery as well as the development of a cadre of local or regional BFA trainers to ensure sustainability.

## 6.8 REFERENCES

- [1] Cho, Z.-H., Oleson, T.D., Alimi, D. and Niemtzow, R.C. Acupuncture: The search for biological evidence with functional magnetic resonance imaging and positron emission tomography techniques. *J Altern Complement Med.* 2002;8(4):399-340.
- [2] Department of Veterans Affairs, Veterans Health Administration (VHA). VHA Directive 2010-040: Health Care Resources Sharing with the Department of Defense, September 16, 2010. [Internet]. [www.va.gov/vhapublications/ViewPublication.asp?pub\\_ID=2290](http://www.va.gov/vhapublications/ViewPublication.asp?pub_ID=2290), Accessed December 13, 2013.
- [3] Dictionary, Merriam Webster. Acupuncture. [Internet]. [www.merriam-webster.com/dictionary/acupuncture](http://www.merriam-webster.com/dictionary/acupuncture), Accessed December 13, 2013.
- [4] Helms, J.M. The basic, clinical, and speculative science of acupuncture. In: *Acupuncture Energetics – a Clinical Approach for Physicians*. Berkeley: Medical Acupuncture Publishers; 1997:26-27.
- [5] Litscher, G.L., Bauernfeind, G., Xinyan, G., et al. Battlefield acupuncture and near-infrared spectroscopy-miniaturized computer-triggered electrical stimulation of battlefield ear acupuncture points and 50 channel near-infrared spectroscopic mapping. *Med Acupunct.* 2011;23(4):263-270.
- [6] Niemtzow, R. Battlefield Acupuncture. *Med Acupunct* 2007;19(4):225-228.8.
- [7] Niemtzow, R.C., Litscher, G., Burns, S.M. and Helms, J.M. Battlefield acupuncture: Update. *Med Acupunct* 2009;21(1):43-46.
- [8] Niemtzow, R.C. The Role of acupuncture in breast cancer: Magic or medicine? [Presentation]. Department of Defense Breast Cancer Conference. San Diego, CA, USA, September 17, 1998.
- [9] Niemtzow, R.C. Transmembrane potentials of human lymphocytes. In: *Transmembrane Potentials and Characteristics of Immune and Tumor Cells*. Boca Raton, FL, USA: CRC Press, Inc.; 1985:76:69-85.
- [10] Nogier, P., Mallard, A. and Petit, J.F. *Complementary Auricular Reflex Points*. Publisher: Maisonneuve, Sainte Ruffine (France). 1989.
- [11] Nogier, P. The Auricle of the Ear: Zones and Reflex Points. Report from Acupuncture Days-Marseille-February 1956. *Bulletin of the Acupuncture Society* No 20. 1956.
- [12] Nogier, P. *Treatise of Auriculotherapy*. Publisher: Maisonneuve Sainte Ruffine (France). 1969.
- [13] Oleson, T. *Auriculotherapy Manual: Chinese and Western Systems of Ear Acupuncture*, 3rd ed. London: Churchill Livingstone; 2003.
- [14] Pock, A.R. Acupuncture in the U.S. Armed Forces: A brief history and review of current educational approaches. *Med Acupunct.* 2011;23(4):205-209.



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## Chapter 7 – MINDFULNESS-BASED PRACTICES AS A RESOURCE FOR HEALTH AND WELL-BEING

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### **ABSTRACT**

**Background:** Mindfulness-based interventions are becoming increasingly popular in clinical and non-clinical settings. Civilian and Military policy-makers responsible for corporate health management and human-resource development are increasingly interested in mindfulness training as a useful tool for reducing stress and enhancing cognitive performance, leadership, and well-being. **Objective:** This article aims to inform readers concisely about the scope, efficacy, and adequate application of mindfulness training. Moreover, particular interest is paid to rehabilitative and preventive applications of mindfulness in a Military environment.

**Method:** This overview describes mindfulness training programs that are useful for addressing stress-related conditions for North Atlantic Treaty Organization (NATO) troops during times of peace and conflict.

**Conclusions:** Mindfulness has been tested successfully as an applicable measure in the Military. This modality remains to be implemented in clinical and the non-clinical, Military environments to enhance the well-being of every Soldier. First steps could include basic training and leadership programs as well as pre/post-deployment trainings. Targeted populations as educators of mindfulness include chaplains, clinical personnel, physiotherapists, clinical psychologists, psychiatrists, and general practitioners. Finally, the development of a NATO handbook on practical mindfulness training guidelines is recommended, addressing the most important questions and fundamental aspects of a practice.

**Keywords:** Aquatic Body Work, Army, Meditation, Military, Mind/Body Practices, Mindfulness, Prevention, PTSD, Rehabilitation, Soldiers, Stress, Watsu.

### **7.1 INTRODUCTION**

The practice of mindfulness, which is often referred to as “meditation”, is one of the oldest cultural attainments; it dates back to 3,000 – 2,500 BCE. The word “meditation” is linked to the Sanskrit term “bhavana”, which, translated literally, means “cultivation”. In the context of Oriental and Occidental contemplative traditions, meditation is understood as a way of cultivating genuine well-being and virtue, which ultimately leads to the goal of gaining insight into the true nature of reality [32]. Many meditative practices have a common, essential foundation, which is the ability to direct one’s awareness to all phenomena that can arise in a given moment, such as bodily sensations (e.g., the breath), emotions, or mental objects. Object meditative practices can be

categorized as open-mind meditation (e.g., mindfulness meditation) on the one hand or as concentrative meditation (e.g., Transcendental Meditation [TM]) on the other hand. Mindfulness training should neither be equated with relaxation techniques nor considered to be a set of techniques that is solely practiced in a religious or spiritual context. On the contrary, mindfulness practices are currently taught as secular techniques and serve to enable the cultivation of a non-judgmental mindset in which thoughts and emotions are purely observed without automatically reacting. As opposed to relaxation techniques, mindfulness meditation does not serve the purpose of calming down the mind. Like many other benefits of meditation, peace of mind can result as a welcome side-effect but it is not a goal that has to be attained.

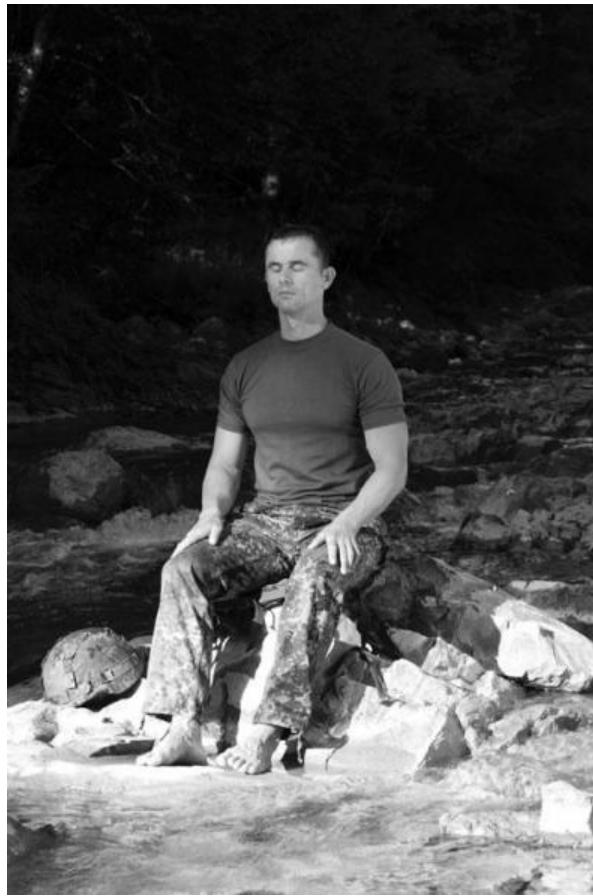
If a practitioner of meditation strives for a calm state of mind, it is very likely that the practitioner would get frustrated, as the expectation for practicing a mindfulness exercise may not be fulfilled. The mental turmoil that builds on the divergence between the goal and actual state of mind would prevent calmness from occurring. Thus, the practitioner is supposed to let go of ruminating on thoughts (as an expression of a performance- and purpose-driven attitude) while focusing his or her attention on a certain object or phenomenon such as breathing. By doing so the practitioner may discover the stillness of each moment in which everything (thoughts, emotions, bodily sensations) occurs. This requires the practitioner to observe and accept whatever arises in the present moment non-judgmentally. It can be very liberating to free oneself from distracting thoughts by focusing on the present moment, resulting in a release of any mental turmoil that can occur by dwelling on thoughts about the past or future. Given that human beings have to plan some activities, the question may arise if a pure experiencing of the moment is possible at all. Even this question is just a thought in this moment while one is reading this sentence. As such, it can be asked: "What sensations are happening while you are reading this thought? How do you experience your body posture while paying attention to this article?" Being mindful is to be fully absorbed in the present moment.

## **7.2 DEFINITIONS OF MINDFULNESS**

Mindfulness can be defined in many different ways, based on contextual perspectives. In some cases, mindfulness is referred to as a method or a spiritual practice. Other people use the term to characterize a mental state or as a personality trait (focusing on the long-term effects). In the psychologic context, mindfulness is conceptualized as "a kind of non-elaborative, non-judgmental, present-centered awareness in which each thought, feeling or sensation that arises in the attentional field is acknowledged and accepted as it is." [4] In common terms, mindfulness is associated with living in the here and now, having moment-to-moment awareness, applying a non-judgmental attitude, and observing thoughts without automatically reacting to those thoughts.

## **7.3 TRADITIONAL MINDFULNESS TECHNIQUES**

There are numerous meditation techniques, such as sitting or walking meditation, the body scan, and mindfulness in daily activities. The sitting meditation is performed when the practitioner is sitting in a comfortable position with a straight back. The focus of attention is on the physical sensations of the breath (i.e., the rise and fall of the abdomen or the sensations in the nostrils or throat; Figure 7-1).



**Figure 7-1: Soldier Performing Sitting Meditation.**

The walking meditation technique is performed during walking with the focus of attention on the physical sensations of the feet; shifting body weight; and the subtle movements in the hips, knees, ankle, feet, heel and ball of the foot (Figure 7-2).



**Figure 7-2: Soldier Performing Walking Meditation.**

The body scan is one of the most popular mindfulness training techniques. The practitioner channels his or her awareness consecutively to certain parts of the body from the top of the head to the tips of the toes. The body scan can be done in a lying, sitting, or standing position (Figure 7-3).



**Figure 7-3: Soldier Performing the Body Scan.**

Finally, mindfulness in daily activities is focusing on tasks or activities that are performed during the day, such as washing dishes, drinking water, or eating. Mindfulness can be practiced by anyone, anywhere, and at any time. There are no requirements for mindfulness meditation except the curiosity to explore. The more a person practices mindfulness, the more a presence-centered mindset is cultivated (Figure 7-4).



**Figure 7-4: Mindfulness can be Integrated into Daily Activities.**

## 7.4 COGNITIVE, BEHAVIORAL, AND PHYSIOLOGICAL EFFECTS OF MINDFULNESS

Within the last 3 decades, mindfulness-based interventions have been extensively and successfully evaluated in clinical and non-clinical settings, and mindfulness can be considered to be one of the best-evaluated mind/body practices at this point in time. It has been proven by numerous studies that the practice of mindfulness can promote a wide range of benefits, ranging from better allocation of limited attentional resources [15], [27], increased capacity to regulate one's emotions [1], improved sleep quality [23], [30], enhanced working memory capacity and reduction of negative affectivity [16], reduced stress reactivity, and an increase in well-being [31]. Although the working mechanisms that underlie meditation are still disputed, it can be said that the continuous and serious practice of mindfulness does improve psychophysical self-regulation and promote the capacity to recover from stress. The latter may be attributed to an increase in sleep quality on the one hand (enhanced states of slow wave sleep and rapid eye movement sleep states) and a decreased need for sleep on the other hand. Apart from that, recent studies have suggested that practicing mindfulness may help older practitioners to retain the sleep patterns of younger non-practitioners. It is of clinical interest that mindfulness has a positive impact on preventing relapses of depressive episodes [17], [24], [20] and of substance abuse [33]. Mindfulness-based relapse-prevention programs for substance abuse enhance the client's ability to handle urges and to accept the present moment by acknowledging the craving without reacting to it. Long-term meditative practice can affect the practitioner's traits strongly on the behavioral level but can also manifest physiologically in mindfulness-induced changes of the functional architecture of the brain. Relatively recent studies have also suggested that mindfulness training can facilitate protection against age-related cortical thinning [31], [19], [22] and increase the activation of brain regions that are considered to be responsible for attention control and conscious decision-making. Thus, this research has helped support the evidence that mindful behavior restricts automatic responses to potential stressors [31], [7].

## 7.5 MEASURING MINDFULNESS

From a first-person perspective, mindfulness can be measured by means of self-reported questionnaires and qualitative interviews. This information can be complemented with data gained from electroencephalography, functional magnetic resonance imaging, heart-rate variability, and hormone measurements (e.g., cortisol) as well as cognitive performance and awareness metrics to examine effects indirectly from a third-person perspective. As training of mindfulness can show impacts on the cognitive and perceptual level, the training effects can also be measured in the alteration of time perception ("newness") and fixation of bistable images. [26] A bistable image is one in which the image can be perceived in two different ways. An example of this is illustrated in Figure 7-5 with the Necker Cube [14].

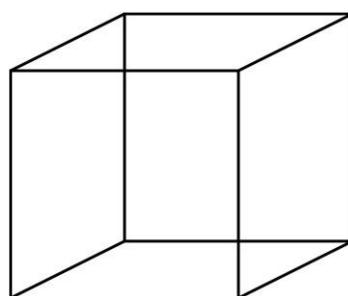


Figure 7-5: Illustration of a Bistable Image: The Necker Cube by BenFrantzDale – Own Work. Licensed under Creative Commons (CCBY).

## 7.6 EFFICACY OF MINDFULNESS-BASED INTERVENTIONS

Over the last 30 years, a substantial amount of scientific literature has been published documenting the efficacy of mindfulness-based interventions in various contexts. Five relatively recent meta-studies have revealed that practice of mindfulness can produce large-to-medium effects on depression and anxiety [2], [11], [5], [12], [10]. A meta-study (or analysis) is one that summarizes the results of data collected in numerous studies with the same methodological approach (e.g., mindfulness training) but in different contexts (e.g., cancer therapy, drug-abuse prevention). If these results are compared with the efficacy of the newest generation of antidepressant drugs (selective serotonin reuptake inhibitors), one can see that the effects of these pharmacologic interventions are relatively small as well as limited because of their potential side-effects [18]. As a result of promising properties, mindfulness-based intervention and prevention programs have increasing applications either as stand-alone treatments or as complementary measures in various clinical and non-clinical settings (Table 7-1). Specific interest for the Military includes chronic pain conditions, Post-Traumatic Stress Disorder (PTSD), and deployment-related stress conditions.

**Table 7-1: Clinical Applications for Mindfulness-Based Interventions.**

<ul style="list-style-type: none"> <li>• Chronic Pain Conditions</li> <li>• Preventing Relapse of Major Depression</li> <li>• Depression</li> <li>• Anxiety</li> <li>• Anger</li> <li>• Headache</li> <li>• Hypertension</li> <li>• Psychosis</li> <li>• Eating Disorders</li> <li>• Body Image Problems</li> <li>• Exhibitionism</li> <li>• Fibromyalgia</li> <li>• Diabetes Type I</li> <li>• Substance Abuse</li> </ul>	<ul style="list-style-type: none"> <li>• Nicotine Dependence</li> <li>• Attention-Deficit Hyperactivity Disorder</li> <li>• Coronary Artery Disorder</li> <li>• Cancer</li> <li>• Chronic Fatigue Syndrome</li> <li>• Heart Disease</li> <li>• Rheumatoid Arthritis</li> <li>• Irritable Bowel Syndrome</li> <li>• Asthma/Respiratory Disorders</li> <li>• Psoriasis</li> <li>• Multiple Sclerosis</li> <li>• PTSD</li> <li>• Deployment-related stress (Military environment)</li> </ul>
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## 7.7 MINDFULNESS-BASED STRESS REDUCTION

Mindfulness-Based Stress Reduction (MBSR) is one of the most popular and well-evaluated mindfulness training concepts available in the Western world. Kabat-Zinn developed this standardized 8-week mindfulness-training program in the late 1970's. Although MBSR encompasses Buddhist meditation techniques (sitting meditation, walking meditation, the body scan) and some Hatha Yoga exercises, it is taught as a secular training concept. The program consists of a 2-hour session of guided meditation training, once per week. In addition, participants are asked to practice mindfulness exercises (homework) for 30 – 45 minutes per day over 8 weeks. During the MBSR course, participants learn to direct their awareness and to keep their focus on occurring phenomena – such as thoughts, emotions and bodily sensations – without getting caught up in a chain of thoughts. In this sense a practitioner who is observing all occurrences is like a spectator watching a play on stage. Analogous to all other secular mindfulness-based approaches, the MBSR program is geared toward

applying mindfulness in all daily activities, such as eating, driving, walking, brushing one's teeth, washing dishes, etc. Because MBSR has been evaluated extensively, it is frequently used in clinical and non-clinical contexts. MBSR courses are very popular among individuals who are willing to enhance their Quality of Life (QoL) in a mindful manner.

## 7.8 MINDFULNESS-BASED APPROACHES EVALUATED IN A MILITARY ENVIRONMENT

### 7.8.1 PROPresence

PROPresence is a German mindfulness training program developed at the University of Munich (LMU). This program was evaluated as a rehabilitative treatment for deployment-related stress in German Military personnel (Figure 7-6).

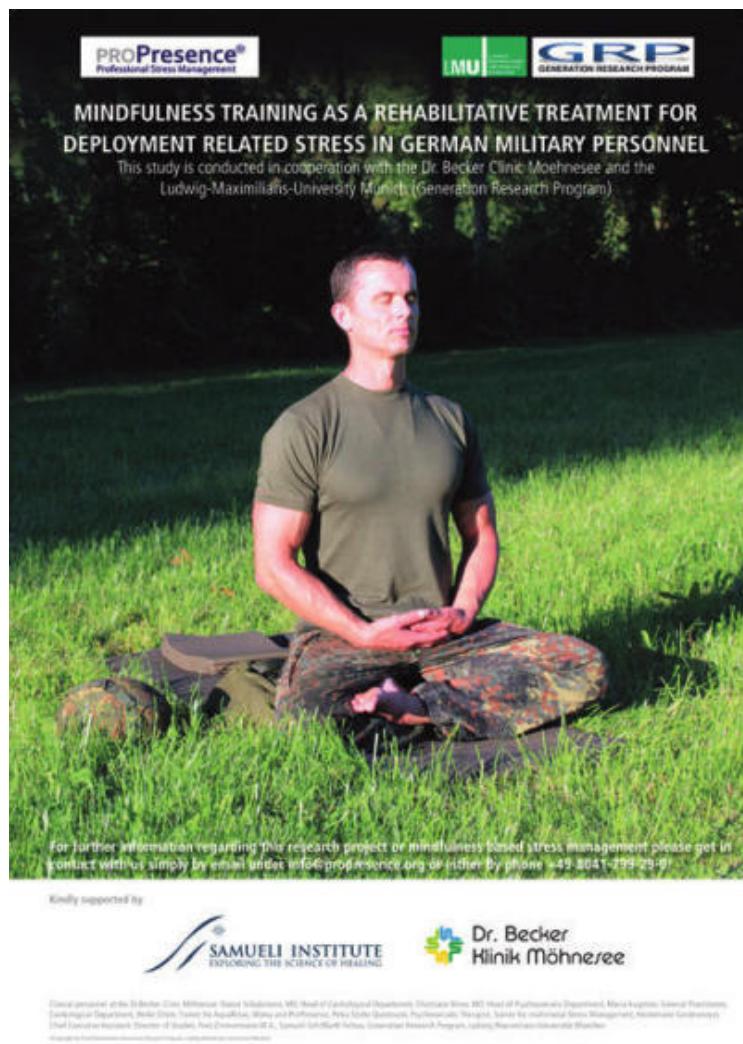


Figure 7-6: PROPresence Recruitment Poster © CPT Fred Zimmermann, Used with Permission.

The study was controlled with an evaluation period of 3 weeks.<sup>1</sup> Soldiers (N = 130) of the German Armed Forces participated in a 2.5-hour guided meditation training, twice per week. In addition, all participants were asked to practice, for 30 minutes, the techniques that had been taught twice per day, as homework. The preliminary data emerging from this study appear to suggest increases in well-being, sleep quality, and cognitive performance, and reduction of stress.<sup>1</sup> With regard to the study's methodological set-up, PROPresence differs from meditation programs that are solely based upon traditional meditation techniques (e.g., sitting meditation, walking meditation, the body scan), because it offers additional exercises for the integration of the left and right hemisphere of the brain to optimize the use of mental capacities and to promote concentration, creativity, and cognitive flexibility (skill building). Figure 7-7 and Figure 7-8 illustrate concurrent use of the left and right brain hemispheres by drawing or writing with both hands.



**Figure 7-7: Ambidextrous Drawing Exercise.**



**Figure 7-8: Ambidextrous Writing Exercise.**

One might ask: "Why does this mindfulness-training program involve additional exercises apart from traditional meditation techniques?" The types of individuals (voluntary versus involuntary participation) who participate in mindfulness programs have different types of skepticism, motivations, and expectations. For example, corporate lead programs have higher involuntary participation because of health department referrals. These participants typically want to reduce their stress and lack interest in meditation practices. Therefore, the programs need to be adapted to address the different mindsets and create interest and curiosity beyond the program. This may increase continued practice of mindfulness techniques. PROPresence follows the principles of "flow-concept" conceptualized by Mihaly Csikszentmihalyi, PhD [9], [21]. According to Csikszentmihalyi, the "flow-concept" requires the performed task to be neither boring nor overstraining. This is called "being in the flow". It is understood that individuals who have a keen interest in an activity become totally absorbed in that activity. Therefore, PROPresence capitalizes on this "automatic focus" on their activity as the starting point. This enables a beginning practitioner to answer the question: "What does it actually mean to be mindful, to live in the moment?" In preliminary exercises, the participant discovers playfully how to focus the mind deliberately on a certain object and, furthermore, how to redirect the focus on the present moment by releasing thoughts. By performing these preliminary exercises, a reference point is created so that the participant gets to know his or her state of mind when being focused and when being "caught up in circle of tumbling thoughts". This distinction is pivotal for continuing mindfulness practice during and after the course. The beginning

<sup>1</sup> The current author is the principal investigator of the study as part of his PhD dissertation. This study is pending PhD defense, manuscript development, and publication submission.

exercises follow the principle that, the higher the physical demand, the more attention is required by the practitioner to fulfill the respective task. For example, when one starts writing one's name or drawing a picture with both hands simultaneously at the same time (Figure 7-8), one will not have the cognitive capacity to do anything else other than the writing or drawing unless one has practiced that for a long time. This technique represents right- and left-brain hemisphere integration. During this exercise, there will be no room for ruminating on thoughts or any kinds of mental discussions, once one is focused on the task. For this reason, PROPresence is also suitable for people with concentration deficits and for children. After the preliminary phase, the practitioner is acquainted with traditional mindfulness techniques and the interval method. The interval-method is an approach that utilizes active thinking (with emphasis on "active") to explore the stillness of each moment in which everything takes place [3]. This practical approach is especially suited for individuals who are inclined to think a lot. In the course of the training program, emphasis is increasingly put on the transition of mindfulness into daily activities and consolidation of the experiences that occurred during the program. With this described methodological setting and content, the PROPresence training program does not only aim to reduce stress but to help each practitioner to live his or her life to the fullest by enfolding his or her inherent potential mindfully in every moment of the day.

### **7.8.2 PROPresence and Watsu (Aquatic Bodywork)**

Although mindfulness-based interventions have been tested in numerous settings with various populations, mindfulness has never been tested in conjunction with Watsu. Watsu, also known as Water-Shiatsu, is a therapeutic form of aquatic bodywork. In mindfulness training, many participants have difficulties engaging in traditional meditation exercises (e.g., focusing on the breath). In addition, individuals who need "hands-on" activity to stay actively engaged can find meditative techniques boring during first attempts. However Watsu, as a very subtle form of aquatic bodywork, helps the participant to focus the mind on bodily sensations because of the uniqueness of the Watsu experience. The experience – which can be described as a mix of sensing weightlessness, massage, muscle relaxation, and joint-mobilization (Figure 7-9, Figure 7-10, Figure 7-11 and Figure 7-12), while in an aquatic environment – is of great value for the ensuing mindfulness sessions. The mindfulness trainer can "pick up on" the deep relaxation experienced during the Watsu session and link this experience to traditional mindfulness techniques, which had appeared to be of no value to the participant in the beginning of the course. Experiencing Watsu gives a participant a taste of stillness without being boring. In this sense Watsu functions as a "door opener" for mindfulness exercises. Many mindfulness-training programs fail, as the practitioners never arrive at the stage of stillness in a short timeframe. For this reason Watsu seems to be crucial for the success and benefit of mindfulness training. Because of this promising aspect of Watsu, a combination of both interventions has been evaluated in the German Armed Forces. The preliminary findings suggest that Watsu, as a supplementary component in a mindfulness training program, does promote commitment and engagement of practitioners to a significant level.



**Figure 7-9: Patient Resting in the Arms of the Therapist.**



**Figure 7-10: Patient Enjoying the Feeling of Weightlessness During the Slow and Soft Movements.**



**Figure 7-11: Attunement of the Patient in the Beginning Phase of a Watsu Session.**



**Figure 7-12: Soft Arm Stretches are an Essential Part of Watsu and Promotes the Mobilization of the Patient.**

### 7.8.3 Mindfulness-Based Fitness Training

Another mindfulness-based approach that has been evaluated in a pilot study with U.S. Marine reservists is the so-called Mindfulness-based Mind Fitness Training (MMFT). Elisabeth A. Stanley, PhD, developed and tested this mindfulness-training program with U.S. Marines who received the training prior to their deployments. The results of this pilot research have indicated that continuous mindfulness training can not only decrease perceived stress but also can enhance cognitive flexibility and conscious decision-making by increasing working memory capacity [16], [28], [29].

### 7.8.4 Transcendental Meditation in a Military Environment

Although Transcendental Meditation (TM) is not considered to be an open-mind meditation, like mindfulness meditation, TM can also be recognized as a meditative practice that has been tested successfully in a Military environment. Brooks and Scarano studied the use of TM, at the Denver Veterans Affairs Hospital, for treating

post-Vietnam adjustment from 1981 to 1982. The study showed that use of TM produced marked improvement in the domains of severity of stress syndrome, anxiety level, depression, degree of alcohol use, insomnia, employment status, and family problems [6]. More recently, Rosenthal and his colleagues examined the effects of TM on U.S. Army Veterans who were affected with combat-related PTSD during their deployments (Operation Enduring Freedom and Operation Iraqi Freedom). The findings of this pilot study suggested in general that the practice of TM could help Soldiers to have reduced PTSD symptoms and to improve their QoL to significant levels [25].

#### **7.8.5 Other Mindfulness-Based Approaches for Therapeutic Settings**

There are several mindfulness-based approaches for therapeutic settings. Three such approaches include:

- 1) Mindfulness-Based Cognitive Therapy (MBCT);
- 2) Dialectical Behavior Therapy (DBT); and
- 3) Acceptance and Commitment Therapy (ACT).

John D. Teasdale, PhD, Zindel Segal, PhD, and Mark Williams, DPhil, developed MBCT. It consists of an 8-week group intervention, which combines elements of cognitive therapy and MBSR. MBCT is designed to prevent relapses of major depressive episodes. Marsha Linehan, PhD, developed DBT. It is based on linking cognitive-behavioral procedures with mindfulness and is used to treat borderline personality disorder. Finally, Steven C. Hayes, PhD, Kelly G. Strosahl, PhD, and Kirk Wilson, PhD, developed ACT. ACT is a psychotherapeutic intervention based on behavioral techniques combined with mindfulness and acceptance-based strategies. These combined programs are being used for a treatment program at the William Beaumont Army Medical Center's Interdisciplinary Pain Management Center for Service Members stationed at Fort Bliss, TX, USA. Although the results are observational only, the program has been well-received by the participants and suggests positive outcomes in the areas of stress management, coping skills, and pain reduction [8].

### **7.9 MINDFULNESS TRAINING: 25 MINUTES OF SELF-CARE**

Many books have been written about mindfulness, and none of these books will provide any direct benefits, as only the personal experiences that these books might trigger can be of value for one's own well-being. In essence, practicing mindfulness does not necessarily rely on specific techniques. No matter if one sits behind one's computer or goes shopping in a supermarket, one can be mindful in whatever posture and situation that person is in. The illustrated techniques make it easier for a beginner to find his or her way into a mindful state. There is no time requirement for mindfulness practice. One can practice for 25 minutes as shown in Box 7-1 or for the whole day when one is awake. The more one practices, the more one cultivates a non-judgmental and presence-centered mindset. Once one starts implementing mindfulness into daily activities, there will be no beginning and no end of the practice, only continuous presence in each moment of the day.

**Box 7-1: Example of Mindfulness Practice**

*Find a quiet room where you can sit alone without being disturbed. Soften the lighting and find a comfortable place to sit for twenty-five minutes – on a chair or, if you’re comfortable, sitting cross-legged on a cushion. You can also lie on your back on your bed, for instance, with your head resting on a pillow, your legs straight, your arms out to the sides, palms up, and your eyes either shut or partly open. Whatever your position, see that your back is straight and that you feel physically at ease. Now focus your attention on your body, experiencing the sensations from the soles of your feet up to the top of your head, both within your body and on its surfaces. Be totally present in your body, and if you note any areas that feel tight, breathe into them (at least in your imagination), and as you exhale, breathe out that tension. Be aware of the sensations in the muscles of your face, jaws, mouth, and forehead and relax them, letting your face be as relaxed as a baby’s when it’s fast asleep. Especially be aware of your eyes. The poets tell us the eyes are windows of the soul. When we’re upset, the eyes tend to feel hard and piercing, as if they’re bulging from their sockets. Not only do our mental states influence our eyes, but we can also influence our minds by softening the eyes. Let them be soft and relaxed, with no contraction between the eyebrows or in the forehead. Set your whole body at ease. For the duration of these twenty-five minutes, apart from the natural movement of respiration, let your body be as still as possible. This will help to stabilize your mind and enable you to focus your attention with greater continuity. If you’re sitting on a chair or cross-legged, slightly raise your sternum and keep your abdominal muscles soft and relaxed, so that when you breathe in, you feel the sensations of the breath go right down to your belly. If your breath is shallow, you’ll feel just the abdomen expand. If you inhale more deeply, first the abdomen, then the diaphragm will expand. And take a very deep breath, first the belly, then the diaphragm, and finally the chest will expand. Try taking three slow, deep breaths, feeling the sensations of respiration throughout your body, inhaling almost to full capacity, and then release the breath effortlessly. Then return to normal, unforced respiration, mindfully attending to the sensations of the breath wherever they arise in the body. Breathe as effortlessly as possible, as if you were deeply asleep. And with each exhalation, think of releasing excess tension in your body, and let go of any clinging to involuntary thoughts that have arisen in your mind. Continue relaxing all the way through the end of the out-breath until the in-breath flows in spontaneously like the tide. As you attend to the gentle rhythm of your respiration, you may hear your neighbor’s dog barking, the sounds of traffic, or the voices of other people. Take note of whatever arises to your five physical senses, moment by moment, and let it be. Notice also what goes on in your mind, including thoughts and emotions that arise in response to stimuli from your environment. Each time your attention gets caught up in sensory stimuli or thoughts and memories, breathe out, release your mind from these preoccupations, and gently return to your breath. Let your attention remain within the field of sensations of your body, and let the world and the activities of your mind flow around you unimpeded, without trying to control or influence them in any way.*

Excerpted with permission from Wallace, 2009 [32].

## 7.10 DISCUSSION

In this chapter, it was pointed out that mindfulness can promote a range of benefits and has been proven to be an efficient and promising approach that positively affects the human body and psyche on many different levels. Although the financial gains of mindfulness training haven’t been evaluated sufficiently in cost-effectiveness studies, it could be that the application of mindfulness-based treatments may result in significant reduction of costs caused by mid- or long-term pharmacological interventions. Against the background of its Military application, the training of mindfulness seems to be a feasible working, coping strategy and a promising alternative for a pharmacologic intervention for deployment-related stress, depression and anxiety during the deployment and post-deployment phase. Apart from that mindfulness trainings can also be utilized as a

preventative measure during the pre-deployment phase and, with regard to the clinical application, also be a suitable adjunct intervention to a cognitive behavioral therapy for PTSD and other stress-related disorders.

## **7.11 CONCLUSIONS**

The practice of mindfulness is one of the oldest cultural attainments. Depending on the context mindfulness can be defined as a method, a spiritual practice, a mental state or as a personality trait. Focusing on the training of mindfulness numerous research studies have suggested a wide range of benefits which include improvements in the fields of attentional awareness, emotional regulation, sleep quality and memory as well as reduced negative affectivity and decreased stress reactivity. Studies within Military populations have furthermore indicated mindfulness training as a feasible and accepted approach. As such mindfulness training programs remain to be implemented in the clinical and non-clinical, Military environment on the behalf of the well-being of every Soldier.

## **7.12 RECOMMENDATIONS**

As a first step, mindfulness training could be integrated into basic training of Service Members as well as into leadership programs and pre-/post-deployment training. The training formats could range from daily workshops up to 8- or 10-week programs. A long-lasting sustainable training effect usually requires a longer training format and continuous practice apart from formal training sessions. All training programs should be complemented, free of charge, with training manuals, audiobooks, smartphone applications, compact discs, and digital versatile discs with guided meditations to facilitate access to a mindful lifestyle. Similar to other Military areas of operation the development of a North Atlantic Treaty Organization handbook for practical mindfulness training guidelines is recommended, addressing the most important questions and fundamental aspects of mindful practice. Apart from that, webinars, and personal and online coaching should be provided to allow practitioners to share their experiences and obtain professional support, as increasing awareness, lack of routine distraction, and unfamiliar resonances from the social environment can be very disturbing, especially in the beginning of a practice. Thus, the appropriate support from a pool of professional mindfulness trainers is crucial for the success and acceptance of this approach. Ideally, every mindfulness trainer would have received an introduction into the field of Military duties and would have become acquainted with the Military environment prior to the start of the work, ensuring that the training and the coaching are adjusted to the living environment of the Soldiers. A promising approach that has not been evaluated yet is mindfulness training embedded in the training of Eastern martial arts. There are already existing training concepts in the German Armed Forces, utilizing martial arts of the Far East as a rehabilitative and preventive measure for addressing deployment-related stress [13]. This approach seems to be particularly appealing to Military personnel, and combines practical training exercises with mindfulness and the teaching of ethical principles (e.g., discipline, integrity). It is therefore recommended to examine the acceptance, commitment, and health-relevant effects of this mindfulness-oriented martial arts training concept in pilot projects within small units. Apart from training mindfulness as a secular set of techniques, it is recommended to provide mindfulness training also in conjunction with Military chaplaincy at home bases and during the deployments abroad. In the clinical context, mindfulness training should also be provided for clinical personnel, physiotherapists, clinical psychologists, psychiatrists, and general practitioners, encouraging everyone to implement mindfulness in their respective fields of work.

## **7.13 REFERENCES**

- [1] Arch, J. and Craske, M. (2006). Mechanisms of mindfulness: Emotion regulation following a focused breathing induction. *Behaviour Research and Therapy*, 44(12), 1849-1858.

- [2] Baer, R. (2003). Mindfulness Training as a Clinical Intervention: A Conceptual and Empirical Review. *Clinical Psychology: Science and Practice*, 10(2), 125-143.
- [3] Bastinac, M. and Ziebell, F. (2013). *Zwischen den Gedanken: Ein Reiseführer in die Welt der Gegenwärtigkeit*. Norderstedt: BoD – Books on Demand.
- [4] Bishop, S., Lau, M., Shapiro, S., Carlson, L., Anderson, N., Carmody, J., Segal, Z., Abbey, S., Speca, M., Velting, D. and Devins, G. (2004). Mindfulness: A Proposed Operational Definition. *Clinical Psychology: Science and Practice*, 11(3), 230-241.
- [5] Bohlmeijer, E., Prenger, R., Taal, E. and Cuijpers, P. (2010). The effects of mindfulness-based stress reduction therapy on mental health of adults with a chronic medical disease: A meta-analysis. *Journal of Psychosomatic Research*, 68(6), 539-544.
- [6] Brooks, J. and Scarano, H. Transcendental meditation in the treatment of post-Vietnam adjustment. *J Counsel Dev*. 1990;64:212-5.
- [7] Cahn, R. and Polich, J. (2006). Meditation states and traits: EEG, ERP, and neuroimaging studies. *Psychological Bulletin*, 132(2), 180-211.
- [8] Communication with COL Richard Petri, Former Director of Interdisciplinary Pain Management Center, William Beaumont Army Medical Center, Ft Bliss, TX, USA, April 2014.
- [9] Csikszentmihalyi, M. and Selega, I. (1988). *Optimal experience: Psychological studies of flow in consciousness* (M. Csikszentmihalyi and I. Selega Eds.). Cambridge: Cambridge University Press.
- [10] Eberth, J. and Sedlmeier, P. (2012). The Effects of Mindfulness Meditation: A Meta-Analysis. *Mindfulness*, 3(3), 174-189.
- [11] Grossman, P., Niemann, L., Schmidt, S. and Walach, H. (2004). Mindfulness-based stress reduction and health benefits. A meta-analysis. *Journal of Psychosomatic Research*, 57(1), 35-43.
- [12] Hofmann, S., Sawyer, A., Witt, A. and Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: A meta-analytic review. *Journal of Consulting and Clinical Psychology*, 78(2), 169-183.
- [13] Holzmann, W. Presentation “Use of martial arts in coping with deployment related stress”, Force Health Protection NATO Conference 2014, Budapest, Hungary, 25 June 2014.
- [14] Illustration of a bistable image: The Necker Cube by BenFrantzDale – Own work. Licensed under Creative Commons (CCBY), 1 May 2007.
- [15] Jha, A., Krompinger, J. and Baime, M. (2007). Mindfulness training modifies subsystems of attention. *Cognitive, Affective, and Behavioral Neuroscience*, 7(2), 109-119.
- [16] Jha, A., Stanley, E., Kiyonaga, A., Wong, L. and Gelfand, L. (2010). Examining the Protective Effects of Mindfulness Training on Working Memory Capacity and Affective Experience. *Emotion*, 10(1), 54-64.
- [17] Kenny, M. and Williams, J. (2007). Treatment-resistant depressed patients show a good response to Mindfulness-based Cognitive Therapy. *Behaviour Research and Therapy*, 45(3), 617-625.

- [18] Kirsch, S., Deacon, B., Huedo-Medina, T., Scoboria, A., Moore, T. and Johnson, B. (2008). Initial Severity and Antidepressant Benefits: A Meta-Analysis of Data Submitted to the Food and Drug Administration. *PLoS Medicine*, 5(2), 0260-0268. doi: doi:10.1371/journal.pmed.0050045.
- [19] Lazar, S., Kerr, C., Wasserman, R., Gray, J., Greve, D., Treadway, M., McGarvey, M., Quinn, B., Dusek, J., Benson, H., Rauch, S., Moore, C. and Fischl, B. (2005). Meditation experience is associated with increased cortical thickness. *Neuroreport*, 16(17), 1893-1897.
- [20] Ma, H. and Teasdale, J. (2004). Mindfulness-based Cognitive Therapy for Depression: Replication and Exploration of Differential Relapse Prevention Effects. *Journal of Consulting and Clinical Psychology*, 72(1), 31-40.
- [21] Nakamura, J. and Csikszentmihalyi, M. (2002). The Concept of flow. In C. Snyder and S. Lopez (Eds.), *Handbook of positive psychology* (pp. 89-105). New York: Oxford University Press.
- [22] Pagnoni, G. and Cekic, M. (2007). Age effects on gray matter volume and attentional performance in Zen meditation. *Neurobiology of Aging*, 28(10), 1623-1627.
- [23] Pattanashetty, R., Sathiamma, S., Talakkad, S., Nityananda, R., Trichur, R. and Kutty, B. (2010). Practitioners of vipassana meditation exhibit enhanced slow wave sleep and REM sleep states across different age groups. *Sleep and Biological Rhythms*, 8(1), 34-41. doi: 10.1111/j.1479-8425.2009.00416.x.
- [24] Peterson, L. and Pbert, L. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry*, 149(7), 936-943.
- [25] Rosenthal, J., Grosswald, S., Ross, R. and Rosenthal, N. (2011). Effects of transcendental meditation in veterans of Operation Enduring Freedom and Operation Iraqi Freedom with posttraumatic stress disorder: a pilot study. *Military Medicine*, 176(6), 626-630.
- [26] Sauer, S., Lemke, J., Wittmann, M., Kohls, N., Mochty, U. and Walach, H. (2012). How long is now for mindfulness meditators? *Personality and Individual Differences*, 52(6), 750-754.
- [27] Slagter, H., Lutz, A., Greischar, L., Francis, A., Nieuwenhuis, S., Davis, J. and Davidson, R. (2007). Mental Training Affects Distribution of Limited Brain Resources. *PLoS Biology*, 5(6), 1228-1235.
- [28] Stanley, E. and Jha, A. (2009). Mind fitness: Improving operational effectiveness and building warrior resilience. *Joint Force Quarterly*, 55, 144-151.
- [29] Stanley, E., Schalda, J., Kiyonaga, A. and Jha, A. (2011). Mindfulness-based mind fitness training: A case study of a high-stress predeployment military cohort. *Cognitive and Behavioral Practice*, 18(4), 566-576.
- [30] Sulekha, S., Thennarasu, K., Vedamurthachar, A., Raju, T. and Kutty, B. (2006). Evaluation of sleep architecture in practitioners of Sudarshan Kriya yoga and Vipassana meditation. *Sleep and Biological Rhythms*, 4(3), 207-214.
- [31] Treadway, M. and Lazar, S. (2009). The Neurobiology of Mindfulness. In F. Didonna (Ed.), *Clinical Handbook of Mindfulness* (pp. 45-57). New York: Springer.

- [32] Wallace, B. (2009). *Mind in the Balance: Meditation in Science, Buddhism, and Christianity*. New York: Columbia University Press.
- [33] Witkiewitz, K., Marlatt, A. and Walker, D. (2005). Mindfulness-based relapse prevention for alcohol and substance use disorders. *Journal of Cognitive Psychotherapy*, 19(3), 211-228.



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## Chapter 8 – SPIRITUALITY/RELIGIOSITY AS A RESOURCE FOR COPING IN SOLDIERS: A SUMMARY REPORT

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### **ABSTRACT**

*Individuals often reflect on their future perspectives and vulnerable concepts of life, and ask for meaning and purpose in life especially when confronted with stressful experiences and subsequent physical impairment and/or mental affections. Spirituality/religiosity is a relevant resource used by individuals to cope. This summary focuses on spirituality/religiosity as a resource for Soldiers to deal with stressful situations, and combat-associated health affections. Specific studies indicate that spirituality can be a resource of relevance for traumatized Soldiers. Particularly for Soldiers after combat experience, an assessment' of their unmet psychosocial and spiritual needs might be appropriate because this (low threshold) assessment avoids a stigmatization as a 'weak' person which would require psychological/psychotherapeutic help. For the Military context it is essential to recognize that spirituality/religiosity may be a beneficial resource to cope and adapt. Both chronic illness and posttraumatic stress have a significant impact on life concerns and affect physical, functional, emotional, social and spiritual well-being. Research has approved that spirituality/religiosity may have multiple beneficial effects of health and performance. Moreover, the ability to reflect priorities and change attitudes and behavior in response to illness/trauma could be an important factor for long-term adjustment, even if symptoms may persist.*

*Keywords: Coping, Health Affections, Integrative Medicine, Religiosity, Resources, Soldiers, Spirituality.*

### **8.1 INTRODUCTION**

Confronted with stressful experiences and subsequent physical impairment and/or mental affections, several individuals reflect their future perspectives and vulnerable concepts of life, and ask for meaning and purpose in life, and which beneficial sources one may rely on (religio). Affected individuals may ask for helpful spiritual resources which can provide a 'secure haven' in their struggling with illness or impairment. In fact, for many confronted with trauma or chronic disease, Spirituality/Religiosity (SpR) is a relevant resource to cope – even in secular societies. Also the special issue of the journal Military Medicine addressed spirituality as a relevant aspect of a multi-dimensional Total Force Fitness model of the U.S. Army – which includes nutritional, psychological, behavioral, social, physical, environmental, medical, and spiritual components [23]. In that special issue, Hufford et al. clearly stated that "for many on the front lines, spirituality and religion are the only 'safe haven' amidst intense operational or combat experiences that can test one's faith. The danger of spiritual and moral trauma is real, and it can initiate a downward spiral of physical, psychological, and behavioral problems in the Service Member" [22].

In this chapter, essential findings from scientific studies on the relevance of SpR (as an attitude) on coping with chronic illness and trauma will be described. Then the putative impact of SpR as a resource to cope will be discussed for the Military context. Spirituality-based interventions such as mindfulness meditation will be outlined in a separate paper, and are not addressed here.

## **8.2 DEFINITIONS OF SPIRITUALITY/RELIGIOSITY**

There are various definitions what SpR is or might be. Depending on the cultural context, religious denomination, worldview, or profession, these definitions may vary significantly.

First of all, spirituality and religiosity are often used as interchangeable terms, yet, from a conceptual point of view, they are not identical. Spirituality is a complex and multi-dimensional construct, and can be defined as an open and individual experiential approach in the search for meaning and purpose in life ('content'), while religion is an institutional and culturally determined approach which organizes the collective experiences of people (faith) into a closed system of beliefs and practices ('form') [10]. Spirituality can be found through religious engagement, through an individual experience of the divine, and/or through a connection to others, environment and the sacred. Moreover, one should differentiate specific beliefs (cognition/emotion), well-being in the context of spirituality and/or religiosity, and specific spiritual/religious practices (action), either within a specific institutional context or highly individual approaches.

One of the more general and broad definitions of spirituality, i.e.:

“Spirituality refers to an attitude of search for meaning in life. The searching individual is aware of its divine origin (either transcendent or immanent, i.e., God, Allah, JHWH, Tao, Brahman, Prajna, Unity etc.), and feels a connection with others, nature and the Divine. Because of this awareness one strives towards the realization of the respective teachings, experiences or insights, which have a direct impact on conduct of life and ethical commitments.” [10]

can be reduced to six subsequent practical principles which can be a framework also for the Military context because it implies also the topics of morality/ethics and the demand to help:

- 1) Life has meaning;
- 2) We share the same origin;
- 3) We are connected;
- 4) We have a responsibility;
- 5) We have an ethical commitment; and
- 6) We protect and shelter.

Today, spirituality is globally attributed to humans' search for meaning in life – which can but must not involve rituals and practices about a higher power or God [31]. Others would define it as a search for 'transcendental truth' may include a sense of connectedness with others, nature, and/or the divine, and thus "spirituality can call us beyond self to concern and compassion for others" [33]. Also Ken Pargament argued that spirituality is the search for significance in ways related to the sacred [28]. This specific "sacred" can be highly individual, and must not necessarily be identical with that of religious denominations.

In a more secular context, spirituality can be viewed as a more general concept, which may include specific forms of religiosity, but shares defined aspects with secular forms of spirituality, too. While this differentiation is

important in countries with a secular and liberal background (i.e., Europe), this distinction is meaningless in countries with conservative theistic beliefs.

To sum it up: “Spirituality is not only the ‘experiential core’ (content) of ritualized religiosity (form), but a complex construct which shares relevant topics with secular aspects of spirituality. The underlying motifs found in the various definitions are the (cognitive) ‘search for meaning’, the (emotional) experience of connectedness (with God, others and nature), and the respective realization in daily life in accordance with related ethical conducts. One may presume that spirituality could be assumed as persons’ commitment to a higher principle/source which is embodied in their daily life” [13].

This is in line also with the definition for spirituality, which the Army Chief of Chaplains employs, “a process transcending self and society that empowers the human spirit with purpose, identity, and meaning” [35]<sup>1</sup>.

### **8.3 ASSOCIATIONS BETWEEN SPIRITUALITY/RELIGIOSITY AND HEALTH-RELATED VARIABLES**

There are an increasing number of studies showing that specific aspects of spirituality/religiosity can be positively associated with health-related variables [24]. Although these results are not always consistent and often dependent on circumscribed populations, distinct cultures and specific measures, many studies found positive associations between defined facets of SpR and psychological well-being [27], quality of life [30], and coping [17]. A systematic review on the “potential beneficial or harmful effects of religious/spiritual coping” indicated that this specific form of coping may be beneficial to “maintaining self-esteem, providing a sense of meaning and purpose, giving emotional comfort and providing a sense of hope” [32].

Moreover, spiritual/religious engagement might also have positive effects on health. A recent meta-analysis (which enrolled 69 studies with healthy populations and 22 studies with patients) showed that SpR was “associated with reduced mortality in healthy population studies (combined hazard ratio = 0.82, 95% CI [0.76 – 0.87], p < 0.001), but not in diseased population studies (combined hazard ratio = 0.98, 95% CI [0.94 – 1.01], p = 0.19)” [16]. Interestingly, this meta-analysis indicated that organizational activities (i.e., church attendance, engagement in community) were positively associated with reduced mortality, not intrinsic aspects (convictions, experiences, etc.). This may indicate that spiritual/religious engagement can have preventive effects. Further evidence comes from a systematic review, which investigated the cancer risk among members of Christian communities. The included 17 epidemiological studies indicate a reduced cancer risk only for lifestyle-associated cancers (i.e., those associated with tobacco smoking, alcohol consumption, diet, physical activity and reproductive factors). Interestingly, the most important factor for this effect was the healthy lifestyle inherent in religious practices in these communities [20]. This means specific SpR attitudes and convictions and subsequent behavior and activities can be associated with health lifestyle, albeit this will not necessarily guarantee health, prevention of illness, or rapid recovery. Rather it is true that SpR is one factor among several bio-psycho-social variables, which may contribute to health and quality of life.

Although patients, physicians and chaplains may have high expectations, SpR cannot be used like an automatic ‘wishing well’, and it cannot be prescribed. It requires a stable inner conviction (belief/faith), which was approved by positive experiences during life. Then in case of need, one may rely on this resource to cope with illness and suffering.

<sup>1</sup> Provided by email from staff at the Center for Spiritual Leadership (CSL), at the U.S. Army Chaplain Center and School, Fort Jackson, SC, USA, on 14 May 2010; cited in Ref. [35].

Indeed, trauma survivors relying on SpR beliefs for coping may show a greater ability for post-traumatic growth, i.e., greater appreciation of life and changed priorities, warmer, more intimate relations with others, a greater sense of personal strength, recognition of new possibilities, and spiritual development [37]. Moreover, even after spinal cord injury several patients made positive experiences. Contributing factors to facilitate positive views were, personality (confidence, assertiveness, independent person), support systems (family, friends, and/or healthcare professionals), spiritual connection (hope and strength to continue with life), and acceptance of one's disability (many felt that acceptance was ongoing, requiring time and reflection) [36].

Thus, several patients may use their SpR foremost as a 'strategy' to cope with illness and suffering [28], even in a secular society [4], [6], [38], [39]. Whether it can be objectified or not, it is of importance that patients with chronic diseases regard their SpR as beneficial to manage their life more consciously, to promote inner strength, providing feelings of inner peace, to attain a deeper connection with others and the world around, to cope better with illness, and even to restore to mental and physical health [5].

However, one has to face the fact that a growing number of individuals in Western societies reject institutional religiosity, but may have an interest in more secular and individual approaches. Here, specific aspects of spirituality such as Conscious interactions (with others, self and environment) and Compassion/Generosity are of higher relevance than a conventional religious orientation [8]. These specific aspects can be regarded as 'shared values' among different religious and cultural approaches, and are of relevance even for a-religious skeptics.

## **8.4 SPIRITUAL NEEDS**

Although several individuals may have lost faith in institutional religiosity, they may nevertheless have specific spiritual needs – which are in most cases neither recognized nor addressed by healthcare professionals. A recent study among 230 patients with advanced cancer has shown that a majority of these patients (72%) reported that their spiritual needs were supported minimally or not at all by the medical system, while 47% of them felt supported minimally or not at all even by a religious community [1]. This means, a large proportion of patients are left alone with unmet spiritual needs because no one feels responsible or competent to address them.

Also a survey among more secular German patients with chronic pain conditions revealed that 23% of them talked with a chaplain/priest about their spiritual/religious needs, 20% had no partner to talk about these needs, while for 37% it was important to talk with their medical doctor about these needs [6]. Yet, most physicians lack the necessary time and skills to address their patients' spiritual needs. However, this support is essential for the patients, because supporting these needs by the medical team and pastoral care visits was significantly associated with patients' quality of life [2].

If it is true that several patients do have psychosocial and spiritual needs, which are important to them, then these needs have to be identified. Only when these needs are identified, healthcare professionals, Military supervisors, and also patients' relatives have the chance to react and support them in their struggle with health afflictions or even chronic and fatal diseases.

For research and clinical practice a conceptual framework was suggested which categorizes four (interconnected) core dimensions of psychosocial and spiritual needs, i.e., Connection (i.e., love, belonging, alienation, partner communication), Peace (i.e., inner peace, hope, balance, forgiveness, distress), Meaning/Purpose (meaning in life, self-actualization, role function, etc.), and Transcendence (i.e., spiritual resources, relationship with God/Sacred, praying), which can be attributed to the underlying categories of social, emotional, existential, and religious [9].

In U.S. American cancer patients, spiritual and existential needs were specified by their intention to get help with overcoming their fears, to find hope, meaning in life, spiritual resources, or someone to talk to about finding peace of mind [26].

In German patients with chronic pain diseases and cancer, Religious needs and Existential needs scored relatively low, while needs for Inner Peace and Giving/Generativity scored high [11]. Particularly the needs for Giving/Generativity are of interest because they address the intention to give solace to someone, to pass their own life experiences on to others, and to be assured that life was meaningful and valuable [11]. This ability to care for others, to guide the next generation, and to know that their own actions and decisions were meaningful, is of outstanding importance also for traumatized Soldiers. Similar findings were observed in predominantly atheistic patients from Shanghai [12], and Catholic patients from Poland [14]. Interestingly, particularly this generativity aspect of spirituality connects to three functions of the U.S. Army chaplaincy's definition of spirituality, i.e., empowering people with purpose, identity, and meaning [35].

Thus, individuals with chronic health afflictions predominantly report needs related to inner peace and generative relatedness on a personal level, whereas needs associated with transcendent relatedness were of minor relevance – at least in secular societies. Nevertheless, even a-religious skeptics can express specific religious needs, and these should be recognized.

## **8.5 SPIRITUALITY IN THE MILITARY CONTEXT**

There are only a few empirical studies addressing the relevance of spirituality/religiosity in a Military setting. A survey of World War II veterans, two recent studies, and preliminary data from an ongoing study among German Soldiers will be highlighted here.

A survey of World War II veterans (random national sample of 7,500 persons) found that church attendance was more often among those who faced heavy combat and claimed that their war experience was negative, while those who claimed their experience was positive attended church less often [34]. Thus, negative combat was related to religious practice. One may suggest that this is a strategy of relief.

Referring to data of the “2008 Department of Defense Survey of Health-Related Behaviors Among Active Duty Military Personnel” (including datasets of 28,546 participants), Hourani and co-workers [21] reported that spirituality buffered depression and PTSD symptoms only among those with low-moderate combat exposure, while a medium level of spirituality was protective of self-reported suicidal ideation/attempt. Interestingly, the authors stated, “high levels of spirituality may be associated with greater suicidal ideation or attempt in this non-deployed sub-group of Military personnel” [21]. The implication of this surprising finding is currently unclear. However, spirituality was measured with two items only (importance of religious/spiritual beliefs, and influence of religious/spiritual beliefs on decision-making), which is pragmatic in such a large-scale study, albeit a highly reduced approach to address a multi-faceted dimension such as spirituality. Moreover, the psychological profile of these “high spirituality” persons is unclear. It might be, as stated by the authors, that this “non-deployed group is coming into the service with higher levels of suicidal ideation”. The findings of Hourani’s study point clearly to the fact that “the buffering role of spirituality in mental health is limited” and that it “may be potentially overwhelmed by great stress, such as high levels of combat exposure” [21].

A further study, the “Army’s Excellence in Character, Ethics, and Leadership (EXCEL) survey”, refers to data of 1,366 Soldiers with combat experience in Iraq (collected in the summer of 2009) [35]. For this study, a multi-dimensional approach to measure spirituality with 15 items and three underlying factors were used, i.e.:

- 1) Connection to Others;

- 2) Religious Identification; and
- 3) Hopeful Outlook.

While there were no significant correlation between these three measures and the number of deployments, higher spirituality scores correlated weakly with age and rank [35]. More interestingly, spirituality correlated moderately with variables such as moral courage/ownership, moral efficacy, embracing Army values, intent to report unethical conduct, and Soldier identification. However, religious identification correlated less strong than hopeful outlook or connection to others. A further important finding of this study was that Soldiers' emotional resilience was moderately associated with their spirituality, particularly with hopeful outlook, while physical and psychological fatigue was only marginally and inversely associated with spirituality [35].

A current study enrolling German Soldiers (n = 1,092) addresses their psychosocial spiritual needs and mental health affections (Büssing et al., accepted for publication) [15]. The data are in line with findings among German patients with chronic diseases, i.e., religious needs and existential needs scored low in the enrolled Soldiers, while inner peace needs and giving/generativity needs were of higher relevance. Particularly existential needs and inner peace needs correlated moderately with Soldiers' Perceived Stress Scale (PSS) and PTSD symptoms (PCL-M scale), and inversely with life satisfaction [15]. Giving/generativity needs were moderately associated with perceived stress and PTSD symptoms. In contrast, religious needs were only marginally associated with stress and PTSD symptoms, but not with life satisfaction [15]. This means, although most German Soldiers report no specific religious or existential needs, half of them have inner peace needs and giving/generativity needs. Because these needs were significantly correlated with health affections and reduced life satisfaction, they require further attention as they may indicate a chance for support beyond a stigmatizing psychotherapeutic treatment.

The current studies show that particularly the relational and hope-associated aspects of spirituality were associated with Soldiers' ethical attitudes and personal resilience, while the self-ascribed importance of religious/spiritual beliefs and their influence on decision-making is not necessarily a buffer against depression or PTSD symptoms. In fact, SpR as an attitude can be a guideline for ethical decisions and moral behavior, and can be helpful to deal with suffering and a resource of hope. Indeed, "religious moral beliefs" of 130 male war veterans from Bosnia and Herzegovina were helpful to protect their mental health after surviving multiple war traumas [19]. Yet, SpR is by no means a 'tool' to create health or buffer against any harm. Rather it is true that specific spiritual needs may indicate psycho-emotional problems, which could be supported very early to prevent health affections and service failure.

## **8.6 HELP-SEEKING FROM SPIRITUAL COUNSELORS AND CLERGY**

In the U.S. and Canadian Army, Soldiers' help-seeking behavior is encouraged, because (silent) mental health affections in response to stressful missions ("suffering while functioning") are no longer regarded as a stigma. Nevertheless, there are still several barriers, both structural and individual (i.e., the attitude of "self-management", and thus masked impairment) which makes it difficult to identify the factual needs.

Nevertheless, Soldiers and veterans are seeking help for depression and PTSD from spiritual counselors and clergy. Bonner et al. screened veterans with probable major depression and PTSD (n = 761) and found that 47% of them "endorsed being 'very' or 'somewhat likely' to seek help for emotional problems from spiritual counselors", while 12% reported "actual spiritual counselor/clergy consultation" [3]. Thus, the authors advised to integrate spiritual counselors/clergy into care teams. Moreover, also some veterans at-risk of suicide were actively seeking pastoral care, "demonstrating a demand for such services" [3].

## 8.7 DISCUSSION

Both chronic illness and posttraumatic stress have a significant impact on life concerns and affect physical, functional, emotional, social and spiritual well-being. Research has suggested that SpR may have multiple beneficial effects of health and performance. Moreover, the ability to reflect priorities and change attitudes and behavior in response to illness/trauma could be an important factor for long-term adjustment, even if symptoms may persist. There is no doubt that specific beliefs (which may provide support in times of need), values (which also have an influence on health and risky behavior) and practices/engagement (which may provide psycho-emotional comfort) may contribute to mental stability. Yet, engagement in specific SpR issues or even strong religious beliefs is by no means a 'preventive protection' against combat damage or health afflictions.

It might be a misinterpretation of research data when it is the aim to utilize spirituality as a preventive 'tool'. So far it is unclear whether or not specific training programs aiming to improve Soldiers' "spiritual fitness", such as the Comprehensive Soldier Fitness (CSF) program of the U.S. Army, which involves the core dimensions – physical, emotional, social, family, and spiritual (including strengthening beliefs and values), to strengthen Soldiers' general resilience is effective with respect to the intended aims (i.e., reduce PTSD or suicide risk) [18]. Although there is no doubt that such programs can be of value for those who share the same beliefs; Soldiers who reject these specific forms of Christianity may have problems with it.

One has to recognize that we all have specific attitudes, convictions and beliefs that may differ with respect to the respective cultural and religious context. Simply assessing whether a Soldier has a specific belief or not, can be a first step, yet it is not enough to assess a complex and multi-faceted construct such as spirituality/religiosity.

## 8.8 CONCLUSIONS

In the Military context, it is essential to recognize that SpR is a beneficial resource for aiding coping and adaptation. Although not all Soldiers may share the same underlying beliefs, it is nevertheless of importance to acknowledge and support SpR attitudes and convictions of Soldiers who rely on this resource.

## 8.9 RECOMMENDATIONS

Studies indicate that spirituality can be a resource of relevance for traumatized Soldiers. Particularly for Soldiers after combat experience, an assessment' of their unmet psychosocial and spiritual needs might be appropriate because this (low threshhold) assessment avoids a stigmatization as a 'weak' person which would require psychological/psychotherapeutic help. An appropriate instrument to assess these needs might be the Spiritual Needs Questionnaire (SpNQ) which is currently used in a study among German and French Soldiers, and already validated for religious and a-religious patients with chronic diseases [7], [11], [12], [14]. These individual responses can be used to start a conversation/counseling what these needs may mean to the Soldiers and how they can be supported.

Medical doctors, psychologists and Military supervisors are not necessarily supposed to share the spiritual attitudes and convictions of their patients and subordinates, but they should appreciate them and react adequately when specific needs are expressed. An appropriate support of specific spiritual needs may help to improve relevant aspects of patients' quality of life. Research clearly shows that healthcare professionals can play an important role in enhancing patients' psycho-spiritual well-being, i.e., self-awareness, coping and adjusting effectively to stress, relationships, sense of faith, sense of empowerment and confidence, and living with meaning and hope [25].

To address Soldiers' spiritual needs, multi-professional teams (i.e., psychologists, chaplains, nurses, and medical doctors) should care for the multi-faceted needs of their patients/clients. However, Military supervisors and team comrades should be included in this process of care because they share the same responsibility to care for each other.

With respect to the vulnerability-stress-model, one can integrate (and detect) various aspects of SpR and other beneficial resources along a path between stressors and health, which may be a conceptual framework for spiritual care approaches. Reactions towards challenges (i.e., combat trauma) depend on the interaction of several predisposing factors involved (i.e., socialization, dispositions) and availability of social and individual resources (i.e., supporting community, family, team, specific beliefs/convictions), which may generate a basis sense of coherence to determine the handling of such challenges. Specific active coping strategies are the individual processes to handle the burden of the challenges. The complex interplay between these factors determines status of health, illness and recovery (Table 8-1).

**Table 8-1: Illustration of the Complex Interplay of Stressors, Resources and Recovery Determinants.**

Challenges/ Stressors →	Predispositions →	Resources →	Spiritual Needs →	Coping Behavior →	Health Status
<b>Critical life events</b>	Resilience	Social support		Reactive coping strategies	<b>Quality of life</b>
<b>Combat trauma</b>	Ethical values Socialization Education	Self-efficacy Mindfulness Spirituality		Positive life construction	<b>Health affections/ distress</b>

With respect to palliative care, the Pasadena Consensus Conference held in 2009 clearly advised that "spiritual care should be integral to any compassionate and patient-centered healthcare system model of care", and recommended spiritual assessment of both patients and families [29]. These recommendations can be easily transferred to spiritual care of persons which are not necessarily in a palliative situation but may require similar support.

## 8.10 RESOURCE

The Spiritual Needs Questionnaire (SpNQ) can be used as an assessment instrument and can be obtained by the author of this chapter (Email: [Arndt.Buessing@uni-wh.de](mailto:Arndt.Buessing@uni-wh.de)).

## 8.11 REFERENCES

- [1] Balboni, T.A., Vanderwerker, L.C., Block, S.D., Paulk, M.E., Lathan, C.S., Peteet, J.R. and Prigerson, H.G. Religiousness and spiritual support among advanced cancer patients and associations with end-of-life treatment preferences and quality of life. *J Clin Oncol* 2007;25:555-560.
- [2] Balboni, T.A., Paulk, M.E., Balboni, M.J., Phelps, A.C., Loggers, E.T., Wright, A.A., Block, S.D., Lewis, E.F., Peteet, J.R. and Prigerson, H.G. Provision of spiritual care to patients with advanced cancer: associations with medical care and quality of life near death. *J Clin Oncol* 2010;28:445-452.

- [3] Bonner, L.M., Lanto, A.B., Bolkan, C., Watson, G.S., Campbell, D.G., Chaney, E.F., Zivin, K. and Rubenstein, L.V. Help-Seeking from Clergy and Spiritual Counselors Among Veterans with Depression and PTSD in Primary Care, *J Relig Health* 2013;52(3):707-718.
- [4] Büsing, A., Ostermann, T. and Koenig, H.G. Relevance of religion and spirituality in German patients with chronic diseases, *Int J Psychiatry Med.* 2007;37:39-57.
- [5] Büsing, A. and Koenig, H.G. The BENEFIT through spirituality/religiosity scale. A 6-item measure for use in health outcome studies. *Int J Psychiatry Med.* 2008;38:493-506.
- [6] Büsing, A., Michalsen, A., Balzat, H.J., Grünther, R.A., Ostermann, T., Neugebauer, E.A. and Matthiessen, P.F. Are spirituality and religiosity resources for patients with chronic pain conditions? *Pain Med.* 2009;10:327-339.
- [7] Büsing, A., Balzat, H.J. and Heusser, P. Spiritual needs of patients with chronic pain diseases and cancer – validation of the spiritual needs questionnaire. *Eur J Med Res* 2010;15:266-273.
- [8] Büsing, A., Föller-Mancini, A., Gidley, J. and Heusser, P. Aspects of Spirituality in Adolescents. *Int J Child Spiritual* 2010;15(1):25-44.
- [9] Büsing, A. and Koenig, H.G. Spiritual needs of patients with chronic diseases. *Religions* 2010;1:18-27.25.
- [10] Büsing, A. Measures of Spirituality in Health Care. In: Cobb, M.R., Puchalski, C.M. and Rumbold, B. (Eds.). *Oxford Textbook of Spirituality in Healthcare*. Oxford University Press, 2012; pp. 323-331.
- [11] Büsing, A., Janko, A., Baumann, K., Hvidt, N.C. and Kopf, A. Spiritual needs among patients with chronic pain diseases and cancer living in a secular society. *Pain Med* 2013;14:1362-1373.
- [12] Büsing, A., Zhai, X.F., Peng, W.B. and Ling, C.Q. Psychosocial and spiritual needs of patients with chronic diseases: validation of the Chinese version of the Spiritual Needs Questionnaire. *J Integr Med* 2013;11:106-115.
- [13] Büsing, A. Health-Related Quality of Life and Trust in God's Help. In: Michalos, A.C. (Ed.). *Encyclopedia of Quality of Life Research*. Dordrecht: Springer, 2014; pp. 2801-2807.
- [14] Büsing, A., Pilchowska, I. and Surzykiewicz, J. Spiritual Needs of Polish Patients with Chronic Diseases. *Journal of Religion and Health* 2014 (Online first: doi 10.1007/s10943-014-9863-x).
- [15] Büsing, A. and Recchia, D.R. Spiritual and non-spiritual needs among German soldiers and their relation to stress perception, PTDS symptoms, and life satisfaction – Results from a Structural Equation Modeling approach. *J Rel Health* 2015 (Online first: doi 10.1007/s10943-015-0073-y).
- [16] Chida, Y., Steptoe, A. and Powell, L.H. Religiosity/spirituality and mortality. A systematic quantitative review. *Psychother Psychosom* 2009;78:81-90.
- [17] Cumming, J.P. and Pargament, K.I. Medicine for the Spirit: Religious Coping in Individuals with Medical Conditions. *Religions* 2010;1:28-53.
- [18] Edelson, R. and Soldz, S. Does Comprehensive Soldier Fitness Work? CSF Research fails the test. Coalition for an Ethical Psychology Working. Working paper Number 1, May 2012; [Internet].

[http://www.ethicalpsychology.org/Eidelson-&-Soldz-CSF\\_Research\\_Fails\\_the\\_Test.pdf](http://www.ethicalpsychology.org/Eidelson-&-Soldz-CSF_Research_Fails_the_Test.pdf), Accessed June 23, 2015.

- [19] Hasanović, M. and Pajević, I. Religious Moral Beliefs Inversely Related to Trauma Experiences Severity and Depression Severity among War Veterans in Bosnia and Herzegovina. *J Relig Health* 2013;52(3): 730-739.
- [20] Hoff, A., Johannessen-Henry, C.T., Ross, L., Hvidt, N.C. and Johansen, C. Religion and reduced cancer risk: what is the explanation? A review. *Eur J Cancer* 2008;44:2573-2579.
- [21] Hourani, L.L., Williams, J., Forman-Hoffman, V., Lane, M.E., Weimer, B. and Bray, R.M. Influence of spirituality on depression, posttraumatic stress disorder, and suicidality in active duty military personnel. *Depress Res Treat*, 2012 Volume 2012, Article ID 425463. [Internet]. <http://www.hindawi.com/journals/drt/2012/425463/>.
- [22] Huffort, D.J., Fritts, M.J. and Rhodes, J.E. Spiritual Fitness. *Mil Med* 2010;175(8):73-87.
- [23] Jonas, W.B., O'Connor, F.G., Deuster, P., Peck, J., Shake, C. and Frost, S.A.S. Why Total Force Fitness? *Mil Med* 2010;175(8):6-13.
- [24] Koenig, H.G., King, D. and Carson, V.B. *Handbook of Religion and Health*. 2nd edition. Oxford, UK: Oxford University Press, 2010.
- [25] Lin, H.R. and Bauer-Wu, S.M. Psycho-spiritual well-being in patients with advanced cancer: an integrative review of the literature. *J Adv Nurs* 2003;44:69-80.
- [26] Moadel, A., Morgan, C., Fatone, A., Grennan, J., Carter, J., Laruffa, G., Skummy, A. and Dutcher, J. Seeking meaning and hope: self-reported spiritual and existential needs among an ethnically-diverse cancer patient population. *Psychooncology* 1999;8:378-385.
- [27] Moreira-Almeida, A., Neto, F.L. and Koenig, H.G. Religiousness and mental health: a review. *Rev Bras Psiquiatr* 2006;28:242-250.
- [28] Pargament, K.I. *The psychology of religion and coping: Theory, research, practice*. New York: Guilford, 1997.
- [29] Puchalski, C., Ferrell, B., Virani, R., Otis-Green, S., Baird, P., Bull, J., Chochinov, H., Handzo, G., Nelson-Becker, H., Prince-Paul, M., Pugliese, K. and Sulmasy, D. Improving the quality of spiritual care as a dimension of palliative care: the report of the Consensus Conference. *J Palliat Med*. 2009;12:885-904.
- [30] Sawatzky, R., Ratner, P.A. and Chiu, L. A meta-analysis of the relationship between spirituality and quality of life. *Social Indicators Research* 2005;72:153-188.
- [31] Tanyi, R.A. Nursing theory and concept development or analysis. Towards clarification of the meaning of spirituality. *J Adv Nurs* 2002;39:500-509.
- [32] Thuné-Boyle, I.C., Stygall, J.A., Keshtgar, M.R. and Newman, S.P. Do religious/spiritual coping strategies affect illness adjustment in patients with cancer? A systematic review of the literature. *Soc Sci Med*. 2006;63:151-164.

- [33] Underwood, L.G. and Teresi, J.A. The Daily Spiritual Experience Scale: Development, Theoretical Description, Reliability, Exploratory Factor Analysis, and Preliminary Construct Validity Using Health-Related Data, *Ann Behav Med* 2002;24:22-33.
- [34] Wansink, B. and Wansink, C.S. Are There Atheists in Foxholes? Combat Intensity and Religious Behavior. *J Relig Health* 2013;52:768-779.
- [35] Wester, F.C. Soldier Spirituality in a Combat Zone: Preliminary Findings About Correlations with Ethics and Resiliency. The Army's Excellence in Character, Ethics, and Leadership (EXCEL) survey. [Internet]. <http://isme.tamu.edu/ISME11/Wester-ISME2011.pdf>, Accessed June 23, 2015.
- [36] Wiechman Askay, S. and Magyar-Russell, G. Post-traumatic growth and spirituality in burn recovery. *Int Rev Psychiatry* 2009;21(6):570-579.
- [37] Weitzner, E., Surca, S., Wiese, S., Dion, A., Roussos, Z., Renwick, R. and Yoshida, K. Getting on with life: positive experiences of living with a spinal cord injury. *Qual Health Res*. 2011;21:1455-1468.
- [38] Zwingmann, C., Wirtz, M., Müller, C., Körber, J. and Murken, S. Positive and negative religious coping in German breast cancer patients. *J Behav Med*. 2006;29:533-547.
- [39] Zwingmann, C., Müller, C., Körber, J. and Murken, S. Religious commitment, religious coping and anxiety: a study in German patients with breast cancer, *Eur J Cancer Care* 2008;17:361-370.



## Chapter 9 – TACTICS TO OPTIMIZE THE POTENTIAL (TOP) AND CARDIOBIOFEEDBACK (CBF) IN STRESS MANAGEMENT: THE FRENCH EXPERIENCE

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### ABSTRACT

*The effectiveness of two stress psychological fitness management programs based in mind/body approach in stress perception and stress reactivity in a Military population submitted to a daily operational stress was evaluated. 180 young Military fire fighter recruits were randomly assigned to a controlled intervention trial including three groups: a cognitive stress program (Tactics to Optimize the Potential – TOP) group, an emotional CardioBioFeedback (CBF) stress program group, or a control group. The stress programs training lasted eight weeks, with one hour training per week. A placebo was administered as a nutriceutical in all three groups during the time of the training. Primary outcome variables included the perceived stress; second outcome variables included stress reactivity (mindfulness, negative mood, Immunoglobulin A levels). Post-intervention effectiveness on the long-term programs' benefits was evaluated. Both TOP and CBF stress programs reduce operational stress in Military population. Although the size of the effects was small, they must be considered at the clinical level. Long-term effects depend on the frequency of daily practice. Results were discussed with reference to mind/body theory. Short stress programs intervention improved stress perception and stress reactivity in healthy workers. Recommendations about mind/body interventions were proposed for the Military population.*

*Keywords: Anxiety, Mind/Body Intervention Training, Mindfulness, Perceived Stress.*

## **9.1 INTRODUCTION**

Chronic stress at work is a well-known public health problem, which also concerns Military populations [30]-[32]. Stress response leads to specific changes in immunity [1], [21], [50], physiological systems [38], [39], and regulation of stress hormones [5], [20]. Over-exposure to stress has an important role in the development and course of mental diseases, as well as a factor in increased abdominal obesity, osteoporosis, infections and cardiovascular problems [40].

Among psychological fitness treatment protocols, heart coherence, a CBF approach, relies on the fact that heart rhythm becomes more erratic with negative emotions such as anger or frustration stability [28], and more ordered/coherent with sustained positive emotions such as appreciation, love, or compassion [28], leading to optimal performance and well-being [29], [45]. The CBF program uses feedback from a simple pulse sensor to reflect changes in emotional/psychological state [19], [38], and to learn how to reduce stress and stabilize emotions. CBF is also easy to learn and use; it is also cost-effective. Another treatment protocol for psychological fitness, developed by the French Army, focuses on cognitive training to regulate emotions, using Tactics that Optimize Potential (TOP). TOP consists of learning easy techniques of mental skill to improve cognitively based problem-solving [35], [36] through control of respiration, by relaxation [9], [10], [14], [33], [42], and using visualization [23], [43]. These task-oriented coping strategies improve performances [16], [17] and health [37]. TOP is widely practiced in air traffic controllers, with apparently good results [30].

Among Military populations, Military Paris' Fire Fighters (PFFs) appear to be particularly exposed to stress and could benefit from TOP intervention [25]. To test our thesis that Stress Management Programs (SMP) would benefit this group, we hypothesized that:

- 1) Young recruits aiming to become PFFs will be particularly exposed to stress;
- 2) Stress management programs will be effective to reduce perceived stress [7]; and
- 3) The effects of SMP will result in lowered IgA levels.

The first aim of the study was to evaluate the effectiveness of SMP on perceived stress (primary outcome variable) which is considered being sensitive to chronic stress stemming from a life-time of circumstances, to stress concerning expectations with regard to future events, and also to reactions to specific events included in PFFs [4]. The second aim was to evaluate their effectiveness on negative mood, mindfulness, and immunity (secondary outcome variables). A comparison between the two SMP was assessed. Finally, a long-term follow-up was realized to investigate the influence of the frequency of daily practice on the SMP' effectiveness.

## **9.2 METHODS**

### **9.2.1 Participants**

New professional volunteer Fire Fighters (FFs) were recruited from the formation center of the Army's PFFs unit (Paris, France). The ethics committees from the health Army of Paris, France approved the study. To be eligible, participants were: male, with no endocrine disease, no recent extraprofessional life stress event (such as death of a near relative, divorce), no current illness, no use of medications to modulate inflammatory diseases (corticosteroids, anti-inflammatory drugs, immunomodulatory drugs), or use of medications with a chronotropic effect taken over the previous six months (beta blockers, diltiazem, verapamil, anxiolytics or antidepressants).

### **9.2.2 Measurements**

Primary outcome: Perceived Stress Scale (PSS) [4], [7]) was measured using 14 items rated on a five-point scale that ranges from (1) “never” to (5) “often”. Higher scores indicate higher perceived stress. Two sub-factors were calculated: vulnerability or “perceived distress”, and uncontrolled perceived stress [4]. Regarding anxiety and depression predictivity, stress-thresholds have been considered to be pertinent above 27 [8].

Secondary outcomes: the mood was evaluated using an abbreviated version of the Profile Of Mood States (POMS) [30]. It consists of an adjective checklist of 37 items rated on a five-point scale that ranges from (1) “not at all” to (5) “extremely”. The subjects were asked to answer according to their present mood. Six factors were then calculated: anxiety-tension, depression-dejection, anger-hostility, fatigue-inertia, vigor-activity and confusion-bewilderment. For negative mood variable, an index was calculated for each subject separately by adding the score in the mood sub-scales without the activity/vigor.

Mindfulness levels were assessed using the French version of the short form of the Freiburg Mindfulness Inventory-14 (FMI), which is a 14-item 4-point (1 – 4) self-report questionnaire developed for people with no background knowledge about mindfulness [47], [49]. It constitutes a consistent and reliable scale evaluating several important aspects of mindfulness, and is considered as one-dimensional for practical purposes [49]. Depending on the suggested time frame in the instructions, it can be used to assess state- or trait-like components [49]. For the purposes of this study, this short form was used for measuring respondents’ state of mindfulness. Higher scores indicate higher mindfulness.

Immunity assessments concerned salivary Immunoglobulins A (IgA), which are antibodies that play a critical role in mucosal immunity. They are used as immunological stress marker [26], [44]. For each immunity measure, a 5 mL saliva sample was collected in Salivette tubes according to specification of the provider [Salimetrics (Europe Ltd.)]. Two hours before each collection, eating, drinking or smoking were not allowed. Once filled, the tubes were centrifuged, sampled into 1.5 mL aliquots stored at -80°C until analysis. Salivary concentrations were analyzed using the enzyme-link immunoabsorbant assay kits [Kit Salimetrics LLC (PA-USA)]. All samples were analysed in duplicate.

### **9.2.3 Compliance with the Program**

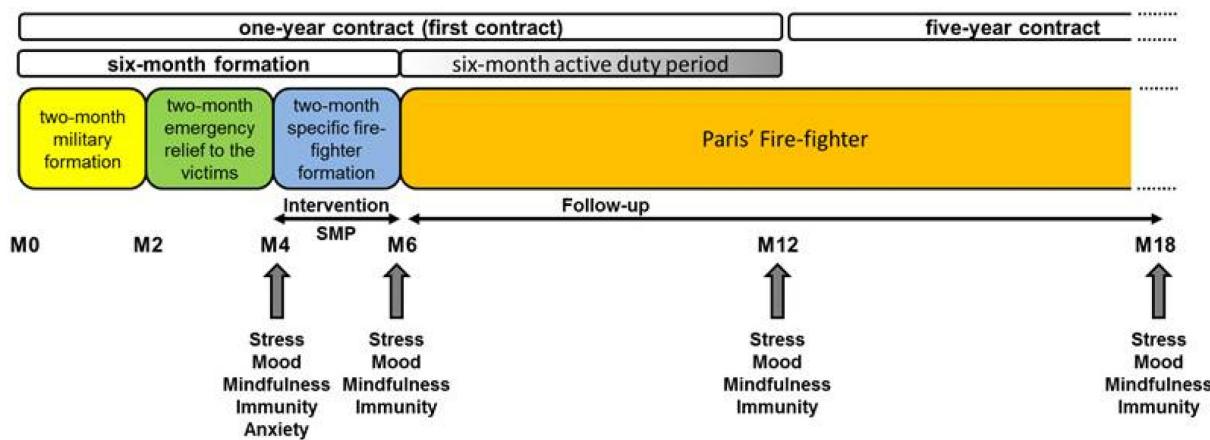
The PFFs’ compliance with the protocol was assessed by the frequency of daily practice evaluated using a Visual Analog Scale (VAS) at 12-months (M12) and 18-months (M18). Subjects had to respond to the following question “Can you indicate the frequency of your daily practice on the bottom line”. The VAS was a horizontal, non-calibrated line of 100 mm, ranging from very low (0; no daily practice) to very high (100; more than three daily exercises of 3 minutes) daily practice.

### **9.2.4 Protocol**

The Army’s PFFs unit includes new PFFs each month for a selective instruction of six months. New PFFs have a one-year contract beginning by a six-month formation (Month 0 to M6) followed by a six-month active duty period (M6 to M12). The six-month formation starts with a two-month Military formation (Months 1 and 2), followed by a two-month emergency relief to the victims (Months 3 and 4), and by a two-month specific fire fighter formation (Months 5 and 6). Within our study, volunteers were included at M4 (baseline measurements) after the first four-month formation because most of the young recruits failed during this period and are revoked. Included participants were randomly assigned (computer-generated randomization) without stratification to one of the three following groups: TOP, CBF, control. A similar number of PFFs were enrolled into each group at

each time. Psychological training (TOP and CBF) was performed during the last two-month (Months 5 and 6) period of specific fire fighters' formation.

The three groups received a placebo as a nutriceutical to mitigate the placebo effect. The placebo consisted of one starch capsule per day during the last two-month period of formation (when the SMP occurred) (Figure 9-1). Approval for placebo use was received from the French agency for the evaluation of medicinal products and safety security. Measuring the number of capsules taken during the program session at Months 5 and 6 assessed compliance with the placebo.



**Figure 9-1: Study Design of the Stress Management Program (SMP).**

Participants were included at M4 within those succeeding the two-month Military formation and the two-month emergency relief to the victims. All baseline assessments (M4) were repeated at the end of the stress management programs (M6), at the end of the six-month active duty period (M12) and at M18, with the exception of IgAs, which were only assessed at M4 and M6 (Figure 9-1). All assessments were realized between 15h30 and 18h00 to avoid circadian variations.

### 9.2.5 Statistical Analyses

Enrollment was set to end when 180 patients (60 per group) were included. We estimated that with 55 participants in each group, the study would have more than 80% power to detect a clinically important difference among the groups in the change of perceived stress, assuming a mean between-group difference of 2 points from control group, with a pooled standard deviation of 2.1 (on the basis of preliminary data), at an alpha level of 5%.

For the Profile Of Mood States (POMS), a negative mood index was calculated for each PFFs separately by adding the score in the mood sub-scales anxiety-tension, depression-dejection, anger-hostility, fatigue-inertia, and confusion-bewilderment without the activity/vigor.

Baseline characteristics were compared between groups using an analysis of variance. Intention-to-treat analyses were performed to assess the effectiveness of the SMP. The effects of each groups' program were evaluated using ANOVA on the changes in outcome variables. Change scores were calculated as change by subtracting baseline (M4) scores from scores at the end of the programs (M6). This was done for each outcome variable separately. Comparisons between CBF and TOP programs were evaluated by post-hoc analyses when results were significant between groups. Cohen's d is used in estimating sample sizes.

For long-term effects (M12 and M18), CBF and TOP groups were pooled in an SMP group for comparisons to controls. The analyses were done per treatment protocol. Repeated measures ANOVAs were applied on the each outcome variable score, separately. Regression equations were performed to determine the impact of the daily practice scores.

Data are presented as mean percentage change  $\pm$  SD, unless otherwise specified. Analyses were performed with SPSS, v17.0. We judged  $p < 0.05$  as significant and  $p \leq 0.1$  as a tendency to a difference.

## 9.3 RESULTS

### 9.3.1 Participants

We randomized 180 PFFs in three groups of 60 PFFs. Fourteen PFFs (7.78%) were excluded due to traumatic injuries between the inclusion and the beginning of the stress management program (Figure 9-2).

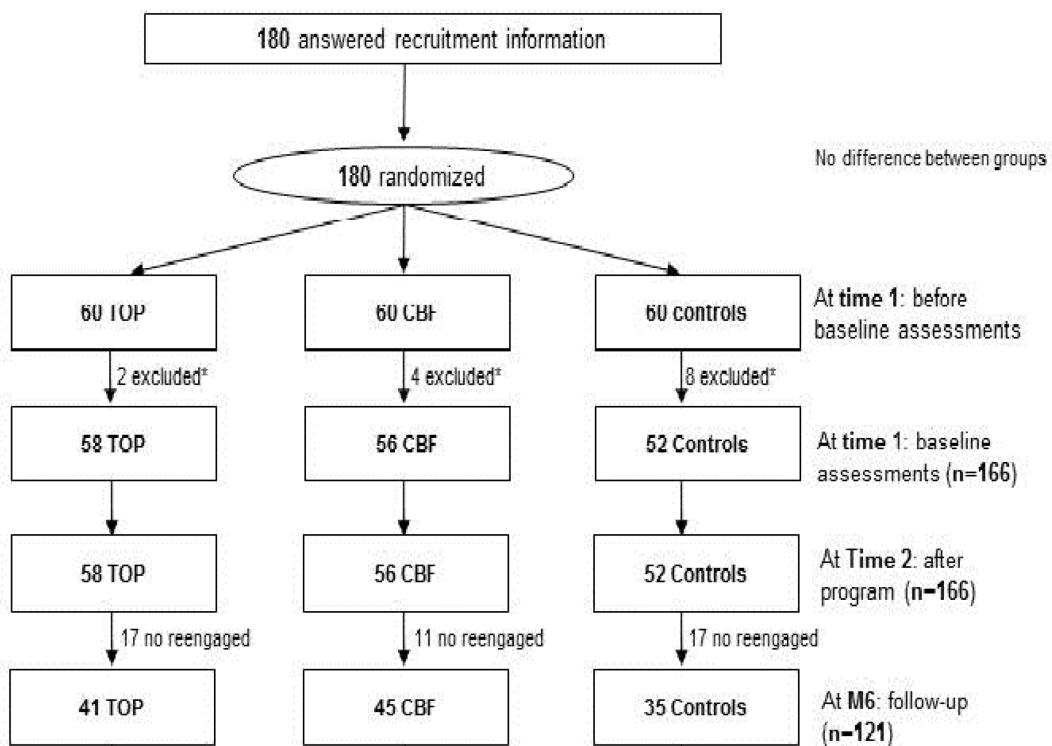


Figure 9-2: Study Flow Chart.

No dropouts were recorded between M4 and M6. Eighty-four completed the entire 14-month study. A comparison between participants withdrawing from the study and those who remained showed no difference in descriptive characteristics, independent of the time at which they withdrew.

The percentage of compliance was around 75% with a mean number of taken capsules of 44.32 between M4 and M6 (73.86%) for the TOP group, 45.58 (75.96%) for the CBF, and 44.5 (74.16%) for the control group. Compliance did not differ between groups.

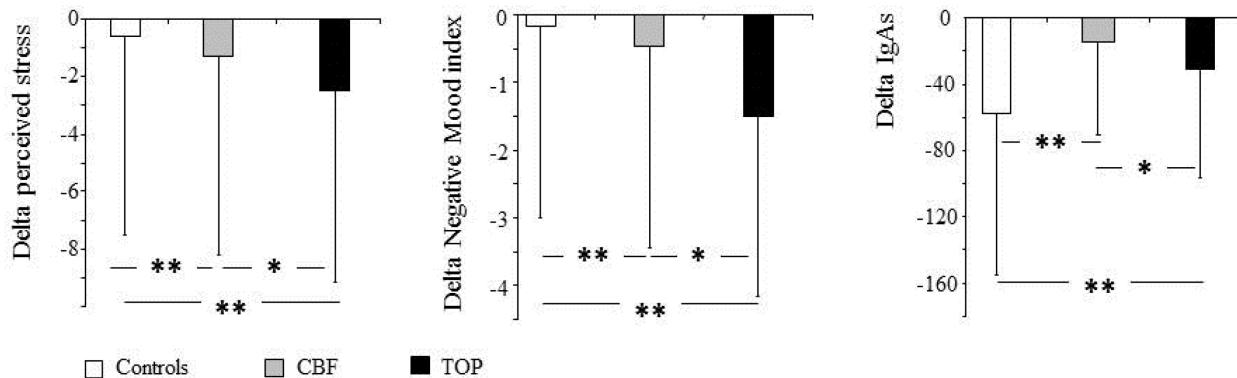
Briefly, participants were males, aged from 18 to 25 years, and mainly Caucasian. 78.3% were not engaged and half had university diploma. All PFFs practiced at least 4h per week of sport, 16.1% were smokers. All PFFs practiced sport with a mean numbers of sport training per day of 6 hours. No difference was observed between groups at baseline (Table 9-1). Eighty seven percent of PFFs were considered stressed at baseline and above the clinical threshold of 27 [8].

**Table 9-1: Means and Standard-Deviations (SD) at Baseline  
for the Full Group and Each of the Randomized Groups.**

	Full Group	Gr TOP	Gr CBF	Gr Control	F (p)
<b>Primary Outcome</b>					
Perceived Stress	34.6 (7.4)	34.8 (6.9)	35.3 (7.1)	33.6 (8.5)	0.77 (0.46)
Uncontrolled Stress	17.7 (4.1)	17.71 (3.7)	17.83 (3.6)	17.55 (4.7)	0.28 (0.75)
Distress	17.11 (3.9)	17.35 (3.6)	17.11 (3.8)	16.86 (4.3)	0.52 (0.59)
<b>Secondary Outcomes</b>					
Mindfulness	40.4 (5.4)	41 (5.4)	39.1 (5.4)	41.1 (5.2)	2.53 (0.09)
Negative Mood Index	18.1 (17.1)	17.3 (14.5)	19.7 (20.4)	17.4 (16)	0.29 (0.74)
IgA ( $\mu$ g/ml)	149.1 (91.6)	132.4 (88.2)	152.1 (87.08)	163.6 (99.7)	0.37 (0.68)

### 9.3.2 Main Outcome

The score of perceived stress change differed between groups ( $F = 2.7$ ;  $p = 0.05$ ). The TOP group had a higher decrease than the controls ( $p = 0.05$ ) and tended to differ from the CBF group ( $p = 0.09$ ) (Figure 9-3). No difference was observed on the PSS sub-factors change. However, at M6, subjects with the TOP program tended to have a smaller score on the uncontrolled sub-factor than subjects with the HC program ( $F = 2.88$ ,  $p = 0.09$ ).



**Figure 9-3: Outcome Measurements after Stress Management Program.**

The strength of a phenomenon is small with  $d = 0.18$  for TOP and  $d = 0.15$  for HC. The number of PFFs decreasing their score under the clinical threshold was higher in the SMP groups (7.8%) than in controls (0%)

(7 PFFs from TOP and 7 PFFs from CBF vs. 0 PFFs in the control group,  $\chi^2 = 4.45$ ,  $p = 0.03$ ), i.e., a 12% reduction of perceived stress occurred in the SMP group compared with the controls. The Number Needed to Treat (NNT) with the intervention (HC and TOP) to see one-person benefit (under the threshold) is nine.

### 9.3.3 Secondary Outcomes

Changes in negative mood index differed between groups ( $F = 3.32$ ;  $p = 0.04$ ). The decrease was higher in the TOP group than in the controls ( $p = 0.04$ ), higher in the CBF group than in the control group ( $p = 0.05$ ) and tended to be higher in the TOP groups than in the CBF group ( $p = 0.06$ ) (Figure 9-3). The strength of a phenomenon is small to middle with  $d = 0.4$  for TOP and  $d = 0.1$  for HC.

No difference was observed in mindfulness changes.

The IgA changes tended to differ between groups ( $F = 2.29$ ;  $p = 0.09$ ) with a tendency to a smaller decrease for TOP and CBF programs than for the control group. Comparison between programs showed a tendency to a smaller decrease for CBF program compared to TOP program ( $p = 0.1$ ; Figure 9-3).

### 9.3.4 Long-Term Effects

**Table 9-2: Means and Standard-Deviations (SD) at M12 and M18 (Follow-Up) for the Full, SMP and Control Groups.**

	Full Group	SMP Group	Control Group	T Value(p)
<b>Perceived Stress Scale</b>				
M12 (N = 121)	40.89 (6.38)	41.13 (6.31)	40.33 (6.65)	0.61 (0.55)
M18 (N = 121)	32.85 (8.16)	32.98 (7.6)	32.47 (9.7)	0.25 (0.8)
<b>State-Anxiety</b>				
M12 (N = 121)	31.67 (11.23)	30.72 (11.25)	34.44 (11.11)	-1.65 (0.1)
M18 (N = 121)	32.02 (9.89)	31.58 (8.73)	32.33 (12.57)	-0.32 (0.75)
<b>Negative Mood Index</b>				
M12 (N = 121)	18.5 (17.82)	17.15 (15.97)	23.26 (21.95)	-2.27 (0.08)
M18 (N = 121)	19.13 (22.64)	17.14 (20.98)	24.47 (26.37)	-0.86 (0.39)
<b>Mindfulness</b>				
M12 (N = 121)	48.10 (7.59)	48.95 (8.21)	45.97 (5.41)	1.9 (0.06)
M18 (N = 121)	41.40 (5.71)	41.31 (5.24)	41.65 (6.95)	-0.24 (0.81)

A time-effect was observed for the perceived stress ( $F = 29.92$ ;  $p = 0.001$ ) with a higher score at M12 (incertitude session) compared with other time of measures. All PFFs were considered stressed at M12 and above the clinical threshold of 27 whereas around 78% of the PFFs were above the clinical threshold at M18 (77.41 for the SMP group and 78.3 for the control group). No group effect was observed.

A time-effect was also observed for mindfulness scores ( $F = 5.31, p = 0.001$ ) with a score higher at M12. The significant interaction between groups ( $F = 3.32; p = 0.02$ ) demonstrated a higher mindfulness score in the SMP group than in controls at M12.

Negative mood index had a time-effect tendency ( $F = 2.27, p = 0.08$ ) with a higher score at M18 (operational session). Interaction between groups tended towards a lower negative mood index in the SMP groups than in controls ( $F = 2.06; p = 0.1$ ) (Figure 9-3).

TOP and CBF groups did not differ in daily practice score. If only 10% of the 62 PFFs from the SMP group did not fulfill the VAS at M12 or at M18, the average of total daily practice in the SMP group was 2.7/10 at M12 and 2.9/10 at M18. PFFs didn't observe their homework assignments without instructors, whatever the SMP. At M12, the daily practice score accounted for 17.9% of the variance in the negative mood improvement ( $F = 2.974, p = 0.03$ ).

## **9.4 DISCUSSION**

Our young Military PFFs had high-perceived stress levels [6], [22], and were generally mindful [46], [47]. The results of our preliminary study showed a benefit for stress programs in treating stress perception compared to the control group in terms of NNT. The significant decrease in % of subjects under the clinical threshold after the stress programs was associated with significant decrease in negative mood and a better mucosal immunity status. This combination of statistically significant improvements in these diverse domains lends support to the clinical relevance of the improvements with the evaluated stress programs.

First, these results are important insofar as research has indicated that perceived stress is often linked to somatic distress, negative affect [6], [8], and psychological disorders such as anxiety and depression [41]. Secondly, the decrease in negative mood was of interest because it is well-known that negative mood is associated with physical and mental disorders [47], mental diseases, [15], [47], and immune mediated diseases [50]. Thirdly, the tendency to the decrease of IgA after the program session is in accordance with the difficulties of the Military formation reported by the PFFs for becoming a FF. A high level of perceived stress already has been associated with a low level of IgA, namely in healthcare professionals [51]. Organizations should be more concerned about job stress, which may contribute to an increase in the incidence of infectious diseases, and subsequent increase in days off work. Interestingly, the perceived stress and negative mood index changes tend to be higher for cognitive-based experiential training whereas IgA decrease tended to be lower for the emotionally-based experiential training compared to the cognitive one or the absence of training. This result cannot be explained by a difference in sport as the PFFs had a similar practice during their initial formation. The positive effect of CBF on IgA already has been demonstrated [27]. The observed higher effect of the TOP on the uncontrolled stress as on negative mood may be understood as an increase in the ability to best evaluate the situation [18], [24]. Whether differences between TOP and CBF warrant further investigations; an association between TOP and CBF may be successful.

Long-term effects evaluation was based on an ecological protocol characterized by an incertitude session following by an operational one. The incertitude session appeared as a real stress period as indicated by the increase in the perceived stress, whatever the groups. The intervention program did not appear to help subjects deal with uncertainty as no difference was observed between groups. Nevertheless, these same subjects revealed improved mindfulness. The concept of mindfulness is characterized by awareness and acceptance of experiences; flexible regulation of attention; an objective receptivity to body experience and an orientation to the here-and-now [3], [48]. This was of interest as it is well-known that high levels of mindfulness are believed to be

associated with well-being, and better identification and description of feelings while low mindfulness is associated with anxiety, and depression and difficulties to cope with stress [3], [46], [48]. It can be proposed that the programs have not improved stress perception when facing a stressful situation but have helped PFFs to cope better with the stressful situation by increasing mindfulness when necessary with some possible benefits on negative mood reactivity in a quieter situation, as it was observed in the operational session. Altogether, these results must be considered in the mind/body connection framework [2], [11], [12], [34], a functioning, which highlights how the body proper is involved in emotions and feelings, rather than just the brain [13]. SMP would be considered as a tool for increasing mind/body connection, which appears particularly efficient when environmental challenges require to cope with stress.

Furthermore, results must be considered by taking into account that the subjects regularly did not practice; one reason can arrive from the decision of the newly promoted Military FF command during the study to introduce ethic formation in place of SMP. It is not clear whether the subjects would become more adept if they have a Military support for the practice or not. Nevertheless, it is reasonable to conclude that greater benefits may accrue to participants if they had a daily practice.

#### **9.4.1 Strengths**

Our study presents some major strength: it was a randomized, run-in design; compliance to SMP was measured; it included a sufficient number of participants to detect differences between groups; community-based long-term intervention; because the study is unique in that both SMP and PFFs have seldom been investigated in RCT using a combination of subjective and objective measures.

It highlights on one hand the effects of SMP in an ecological realistic environment, and on the other hand differences in benefits between cognitive- and emotionally-based training.

#### **9.4.2 Limitations**

There are several limitations to this study – from a methodological point of view, it is not certain that giving the three groups a nutriceutical really mitigates the placebo effect. From a clinical point of view, the clinical benefits have not been evaluated due to the small size of the effects; the results cannot necessarily be generalized to all workers with occupational stress; women were not included, however, using only a male population reduces the variability of measures; drop-outs were high, but many Paris' fire fighters did not have their contract renewed and there was no headquarter support during the follow-up. Compliance may appear poor and may have decreased the benefits of the SMP. Finally, cost benefit in terms of incidence of infectious diseases, and increase of the days off work as well as improvement in Military skills and operational performances were not evaluated.

### **9.5 CONCLUSIONS**

The treatment of stress and stress effects would involve the whole person; body and brain are interconnected in both TOP and CBF stress management programs and indicated relief of operational stress in Paris' fire fighters. To improve personnel performance and well-being, Military, as civilian organizations should be more concerned about occupational stress through promotion of stress management programs. Given that the body is involved in the workings of the brain and emotions, it is logical that treatment of diseases would also involve the whole person, that the body and brain are interconnected.

## **9.6 RECOMMENDATIONS**

Future studies of other stress-reducing interventions, such as meditation Qi Gong and Yoga appears pertinent to evaluate for the Military individuals. Furthermore, conducting interventional trial on stress disease benefits warrants further investigations. In accordance with such results, the main recommendation would be to develop professionals (e.g., trainers, educators) for both training Military population and to facilitate the increase in frequency of daily practice.

## **9.7 REFERENCES**

- [1] Ader, R. Conditioned immunomodulation: research needs and directions. *Brain Behav Immun.* 2003;17:S51-S57.
- [2] Bates, M., Bowles, S., Hammermeister, J., Stokes, C., Pinder, E., Moore, M., Fritts, M., Vythilingam, M., Yosick, T., Rhodes, J., Myatt, C., Westphal, R., Fautua, D., Hammer, P. and Burbelo, G. Psychological fitness. *Mil Med.* 2010;175(8):21-39.
- [3] Brown, K.W. and Ryan, R.M. The benefits of being present: mindfulness and its role in psychological well-being. *J Pers Soc Psychol.* 2003;84(4):822-848.
- [4] Cerclé, A., Gadéa, C., Hartmann, A. and Lourel, M. Typological and factor analysis of the perceived stress measure by using the PSS scale. *Eur Rev Appl Psychol.* 2008;58:227-239.
- [5] Charney, D.S. Psychobiological mechanisms of resilience and vulnerability: implications for successful adaptation to extreme stress. *Am J Psychiat.* 2004;161:195-216.
- [6] Cohen, S., Janicki-Deverts, D. and Miller, G.E. Psychological Stress and Disease. *J Am Med As.* 2007; 298(14):1685-1687.
- [7] Cohen, S., Karmak, T. and Mermelstein, R. A global measure of perceived stress. *J Health Soc Behav.* 1983;24(4):385-396.
- [8] Collange, J., Bellinhausen, L., Chappé, J., Saunder, L. and Albert, E. Perceived stress: when does it become a risk factor for anxiodepressive disorder? *Archives des Maladies Professionnelles et de l'Environnement.* 2013;74:7-15. [Internet]. <http://dx.doi.org/10.1016/j.adm.2012.12.009>.
- [9] Hoffart, M.B. and Pross, K.E. The Benefits of visualization: Research suggests that visualization promotes relaxation, enhances sleep, reduces pain, and increases creativity. *Am J Nurs.* 1998;98(12):44-47.
- [10] Crosnier, S. Evaluation du sommeil des sous-mariniers en situation opérationnelle sur Sous-marins Nucléaires lanceurs d'Engins : intérêt des Techniques d'optimisation du Potentiel (TOP) (Evaluation of the submariners' sleep during a patrol : interests of the TOP program). PhD thesis. University of Medicine of Brest, France, 2013:180.
- [11] Damasio, A.R. *Descartes' Error: Emotion, Reason, and the Human Brain*, New York: Putnam; 1994:312.
- [12] Damasio, A.R. *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*, Harcourt Brace, Orlando, FL, USA: 1999:387.

- [13] Damasio, A.R., Tranel, D. and Damasio, H. Somatic markers and the guidance of behavior: Theory and preliminary testing. In H.S. Levin, H.M. Eisenberg and A.L. Benton (eds.), *Frontal Lobe Function and Dysfunction*, Oxford, UK: Oxford University Press; 1991:217-229.
- [14] Davis, M. and Eshelman, E.R. *The Relaxation and Stress Reduction Workbook*. New Harbinger Publications, USA; 2008:392.
- [15] Denollet, J. and De Vries, J. Positive and negative affect within the realm of depression, stress and fatigue: The two-factor distress model of the Global Mood Scale (GMS). *J Affect Disorders*. 2006;91(2-3): 171-180.
- [16] Endler, N.S., Kantor, L. and Parker, J.D.A. State-trait coping, state-trait anxiety and academic performance. *Pers Indiv Differ*. 1994;16(5):663-670.
- [17] Endler, N.S., Macrodimitris, S.D. and Kocovski, N.L. Controllability in cognitive and interpersonal tasks: is control good for you? *Pers Indiv Differ*. 2000;29(5):951-962.
- [18] Folkman, S., Lazarus, R.S., Dunkel-Schetter, C., DeLongis, A. and Gruen, R.J. Dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *J Pers Soc Psychol*. 1986;50:992-1003.
- [19] Friedman, B.H. and Thayer, J.F. Anxiety and autonomic flexibility: a cardiovascular approach. *Biol Psychol*. 1998;47:243-263.
- [20] Gray, T. Amygdaloid CRF pathways: role in autonomic, neuroendocrine and behavioural responses to stress. *Ann. N.Y. Acad. Med.* 1993;697:53-60.
- [21] Hauger, R., Irwin, M., Lorang, M., Aguilera, G. and Brown, M. High intracerebral levels of CRH result in CRH receptor down regulation in the amygdale and neuroimmune desensitization. *Brain Res*. 1993;676 (1-2):283-292.
- [22] Lane, E.M., Hourani, L.L., Bray, R.M. and Williams, J. Prevalence of perceived stress and mental health indicators among reserve-component and active-duty military personnel. *Am J Public Health*. 2012;102(6):1213-1220.
- [23] Lazarus, S. *Stress, appraisal and coping*. Edition Springer Publishing Company; 1984:456.
- [24] Lazarus, R.S. and Launier, R. Stress-related transactions between person and environment. In: Pervin, LA, Lewis, M. (Eds.), *Perspectives in Interactional Psychology*. Plenum, New York, NY, USA; 1978: 287-327.
- [25] Leifflen, D., Arvers, P. and Lavillunière, N. Occupational stress in Paris Firefighters: from PTSD to Burnout. 2nd Franco-American workshop on war traumatism. EVDG, Paris, France, March 2010.
- [26] McClelland, D.C., Alexander, C. and Marks, E. The need for power, stress, immune function, and illness among male prisoners. *J Abnor Psychol*. 1982;91(1):61-70.
- [27] McCraty, R., Atkinson, M., Rein, G. and Watkins, A.D. Music enhances the effect of positive emotional states on salivary IgA. *Stress Med*. 1996;12:167-175.
- [28] McCraty, R., Atkinson, M., Tiller, W.A., Rein, G. and Watkins, A.D. The effects of emotions on short term heart rate variability using power spectrum analysis. *Am J Cardiol*. 1995;76:1089-1093.

- [29] McCraty, R., Barrios-Choplin, B., Rozman, D. and Watkins, D. The impact of a new emotional self-management program on stress, emotions, heart rate variability, DHEA and cortisol. *Physiol Behav*. 1998;33(2):151-170.
- [30] Morgan III, C.A., Doran, A., Steffian, G., Hazlett, G. and Southwick, S.M. Stress-induced deficits in working memory and visuoconstructive abilities in special operations soldiers. *Biol Psychiat*. 2006;60: 722-729.
- [31] Morgan III, C.A., Wang, S., Mason, J., Southwick, S.M., Fox, P., Hazlett, G., Charney, D.S. and Greenfiel, G. Hormones profiles in humans experiencing military survival training. *Biol Psychiat*. 2000;47:891-901.
- [32] Morgan III, C.A., Wang, S., Rasmussen, A., Hazlett, G., Anderson, G. and Charney, D.S. Relationship among plasma cortisol, catecholamines, neuropeptides Y, and human performance during exposure to uncontrollable stress. *Psychosom Med*. 2001;63:412-422.
- [33] Morin, C.M., Hauri, P.J., Espie, C.A., Spielman, A.J., Buysse, D.J. and Bootzin, R.R. Non-pharmacologic treatment of chronic insomnia. *Sleep*. 1999;22(8):1134-1156.
- [34] Mullen, M. On total force fitness in war and peace. *Mil Med*. 2010;175(8):1.
- [35] Perraut-Pierre, E. *La gestion mentale du stress pour la performance sportive (mental stress regulation for performances in sport)*. Amphora. Paris; 2000:189.
- [36] Perraut-Pierre, E. *Comprendre et pratiquer les Techniques d'Optimisation du Potentiel (TOP) (Understanding and practicing the TOP)*. InterEditions, Paris, France: 2012:285.
- [37] Penley, J.A., Tomaka, J. and Wiebe, J.S. The association of coping to physical and psychological health outcomes: a meta-analytic review. *J Behav Med*. 2002;25:551-603.
- [38] Porges, S.W. Cardiac vagal tone: a physiological index of stress. *Neurosci Biobehav R*. 1995;19(2):225-233.
- [39] Roozendahl, B., Schoorlemmer, G., Koolhaas, J. and Bohus, B. Cardiac, neuroendocrine and behavioural effects of central amygdaloid vassopressinergic and oxytocinergic mechanisms under stress-free conditions in rats. *Brain Res Bull*. 1993;32(6):573-579.
- [40] Ron de Kloet, E., Joëls, M. and Holsboer, F. Stress and the brain: from adaptation to disease. *Nat Rev*. 2005;6:463-475.
- [41] Shacham, S. A shortened version of profile of mood states. *J Pers Assess*. 1983;47:305-306.
- [42] Seaward, B.L. *Managing stress: principles and strategies for health and wellbeing*. Fifth edition; Jones and Bartlett editions Massachusetts, USA: 2006:589.
- [43] Thompson, R.A. and Asquith, P. Quantitation of exocrine IgA in human serum in health and disease. *Clin Exp Immunol*. 1970;7(4):491-500.
- [44] Trousselard, M., Perraut-Pierre, E. and Saint-Aubin, K. Impact of positive emotions enhancement on physiological processes and psychological functioning in military pilots. *Human performance enhancement*

for NATO military operations (sciences, technology, and ethics). Human factors and medicine panel symposium (HFM-181), Sofia, Bulgaria, 05-08/10 2009.

- [45] Trousselard, M., Steiler, D., Claverie, D. and Canini, F. Relationship between mindfulness and psychological adjustment in soldiers according to their confrontation with repeated deployments and stressors. *Psychol.* 2012;3(1):100-115.
- [46] Trousselard, M., Steiler, D., Raphel, C., Cian, C., Duymedjian, R., Claverie, D. and Canini, F. Validation of a French version of the Freiburg Mindfulness Inventory-short version: How mindfulness deals with the stress in a working middle-aged population. *Biopsychosoc Med.* 2010;4(8):1-11.
- [47] Vassend, O., Watten, R., Myhrer, T. and Syvertsen, J.L. Negative affectivity and intellectual ability: A study of their relation to self-reported physical symptoms, perceived daily stress and mood, and disciplinary problems in military recruits. *Soc Sci Med.* 1994;39(4):583-590.
- [48] Walach, H., Buchheld, N., Buttenmüller, V., Kleinknecht, N. and Schmidt, S. Measuring mindfulness – the Freiburg Mindfulness Inventory (FMI). *Pers Ind Diff.* 2006;40:1543-1555.
- [49] Watkins, A.D. Perception, emotions and immunity: an integrated homeostatic network. *Q J Med.* 1995;88:283-294.
- [50] Wright, C.E., Strike, P.C., Brydon, L. and Steptoe, A. Acute inflammation and negative mood: mediation by cytokine activation. *Brain Behav Immun.* 2005;19(4):345-50.
- [51] Yang, Y., Koh, D., Ng, V., Lee, C.Y., Chan, G., Dong, F., Goh, S.H., Anantharaman, V. and Chia, S.E. Self-perceived work related stress and the relation with salivary IgA and lysozyme among emergency department nurses. *Occup Environ Med.* 2002;59:836-841.



## Chapter 10 – INTEGRATIVE MEDICINE AND THE TRAUMA SPECTRUM RESPONSE

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### **ABSTRACT**

*Post-Traumatic Stress Disorder (PTSD) is a widely recognized consequence of deployment, combat exposure and trauma. Post-deployment PTSD commonly co-occurs with other medical problems and mood disorders to include depression, suicidality, substance abuse disorders, anxiety disorders, and chronic pain. These mind and body injuries and their consequences often co-occur and are appropriately considered as war-related, Trauma Spectrum Responses (wrTSR). This article describes the potential role of Complementary and Integrative Medicine (CIM) in the treatment of war-related, Trauma Spectrum Responses (wrTSR) to post-traumatic stress disorder and the associated co-morbidities. This overview will describe the interplay between these co-morbidities as part of the wrTSR as well as suggest how CIM approaches may address many of the challenges in the treatment of wrTSR. CIM modalities include tools, which induce permanent healing in a whole person. Better and more-holistic approaches are needed for healing the wrTSR. In addition, there needs to be greater emphasis on research and implementation of whole-person healing practices. Finally, it is necessary to recognize the importance of healing as much as curing.*

*Keywords: Complementary and Integrative Medicine, Military, Pain, Post-Traumatic Stress Disorder, Salutogenesis, Trauma Spectrum Response, Traumatic Brain Injury.*

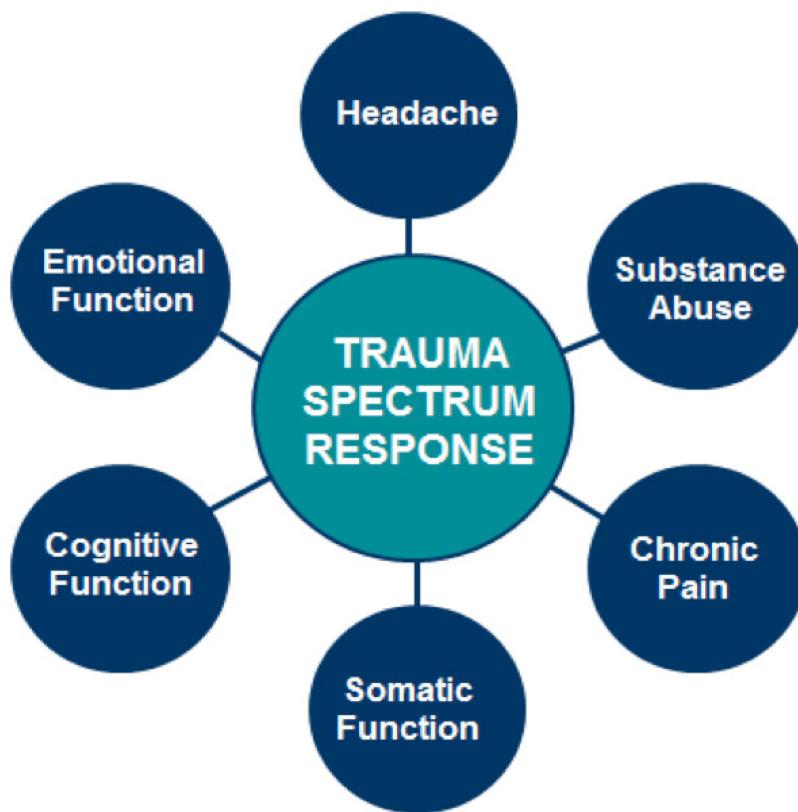
### **10.1 INTRODUCTION**

For more than a decade, the wars in Iraq (Operation Iraqi Freedom; OIF) and Afghanistan (Operation Enduring Freedom; OEF) have produced war-fighters with psychologic injuries, such as Post-Traumatic Stress Disorder (PTSD) and physical injuries, often including Traumatic Brain Injury (TBI). Many of these young men and women are left with long-term symptomatic and functional difficulties [24], [38]. These mind and body injuries, and their consequences, often co-occur and are appropriately considered as war-related, Trauma Spectrum Responses (wrTSR) [79], [80]. This widespread co-occurrence of these conditions is in many ways, a hallmark

of these wars and requires a different approach to management than would be used for the usual civilian traumas.

At the Walter Reed Army Medical Center, in Washington, DC, USA, > 46% of blast-injured patients and 55% of amputees treated during the early years of the wars had also sustained brain injuries. Head and neck injuries occurred in 15% – 20% of all battle injuries, and mild TBI was estimated to afflict up to 28% of all deployed warfighters [79], [80]. Psychologic trauma was also reported as a frequent co-occurrence. Nearly 20% of Soldiers suffer from PTSD [18], [23], and nearly 40% report stress-related dysfunction that prevents re-integration into a full life. Villano et al., [78] and Shipherd et al. [67] reported that depression and anxiety coincide with a syndrome of chronic pain and heightened stress-reactivity, including PTSD, in 24% to 66% of combat-wounded veterans of OIF/OEF.

Cognitive impairment is common in patients with chronic pain and PTSD; the incidence and prevalence of chronic pain, PTSD, other neuropsychiatric conditions, and cognitive deficits in wounded OIF/OEF troops in constellation is high [5], [26]. Estimates are that nearly 60% of these Soldiers have some form of brain-injury condition or constellation of cognitive, emotional and behavioral problems resulting from neural insults [67]. When these conditions are induced by exposure to deployment and battle, we call this constellation of post-trauma-related conditions “*war-related, Trauma Spectrum Responses (wrTSR)*.” (Figure 10-1) As noted by Potash, the wounded veteran presents “new challenges,” including “patients with co-morbid chronic pain … brain trauma and … attendant cognitive issues.” [61]



**Figure 10-1: Trauma Spectrum Response Components.**

The various manifestations of wrTSR may share common causal and recovery mechanisms. Variations in the internal and external environments result in genotypic factors coding for phenotypes that are differentially expressed after mind or body injury. Predisposed individuals express a core constellation of common symptoms that include:

- 1) Mental and emotional distress (e.g., depression, anxiety, anger);
- 2) Cognitive impairment;
- 3) Chronic pain;
- 4) Drug or opioid desensitization; and
- 5) Somatic (sleep, appetite, sexual, energy) difficulties.

The result is that rates of comorbidities are higher than after civilian injuries. For example, in a survey published in 2014 of a single combat brigade 3 months after the warriors returned from Afghanistan, rates of chronic pain were 43% and opioid use in the month prior to participation in the survey was 23% [72].

## 10.2 COMPONENTS OF WRTSR

PTSD is a widely recognized consequence of deployment, combat exposure and trauma. Between 15.6% and 17.1% of warriors in OIF suffered from some severe emotional difficulties, including PTSD [37]. A study by the RAND Corporation put the number at 20% [18]. These rates are not unique to OIF and OEF. Survey researchers have found that > 15% of male Vietnam Theatre Veterans (VTVs) met criteria for current PTSD and 30% met diagnostic criteria for lifetime PTSD [46]. Nearly 9% of female VTVs met current PTSD criteria and 27% met lifetime criteria for PTSD related to Vietnam combat trauma.

Post-deployment PTSD commonly co-occurs with other medical problems and mood disorders, and the majority of individuals with PTSD meet criteria for one other psychiatric disorder; many individuals have three or more [12], [32]. Comorbidities include depression [9], [10], suicidality [59], [65], [69], substance abuse disorders [14], [46], anxiety disorders [12], and chronic pain [6], [7], [52], [81]. Comorbid diagnoses in warriors with combat-related PTSD occur in > 50% [25], [44]. This complicates the treatment process and weakens the prognosis for recovery [32], [63], [82].

## 10.3 PTSD AND SUBSTANCE ABUSE

Substance use disorders are another class of disorders often co-occurring with PTSD. In studies of Vietnam veterans with PTSD, 22% [46] and 39% [14] had alcohol abuse or dependence. People with PTSD may use alcohol and drugs to self-medicate their symptoms [12]. However, an individual with PTSD (particularly a male) is more likely to have an alcohol use disorder that preceded the PTSD [20], [68].

Whatever the cause of comorbidity, it is clear that excessive alcohol use can worsen the symptoms of PTSD, including sleep disturbance, difficulty with concentrating, emotional numbing, social isolation, anger and irritability, depression, and hyper-vigilance. Alcohol also reduces a person's ability to cope with stress. A number of factors complicate the treatment of comorbid PTSD and alcohol use disorder. While alcohol may decrease the severity and number of nightmares that are characteristic of PTSD, alcohol may also exacerbate treatment avoidance [43]. People with PTSD and alcohol abuse/dependence take longer times to respond to treatment and prematurely terminate therapy more often [63], [82].

## **10.4 PTSD AND PAIN**

PTSD and chronic pain often co-occur. More than 10% of 225 patients referred to one VA pain clinic for chronic pain also met diagnostic criteria for PTSD [7]. In a cohort of patients seeking treatment at a multi-disciplinary chronic pain center, 9.5% had “posttraumatic chronic pain syndrome” [56]. Assessments of 139 injured workers with chronic pain who were referred to a rehabilitation program showed that 34.7% had symptoms of PTSD [3]. PTSD rates in patients with pain secondary to a motor vehicle accident range from 30% – 50% [15], [36], [71]. Patients with accident-related pain and PTSD symptoms reported higher levels of pain and distress, compared to accident-related pain in patients without PTSD [27]. Pain was the most common complaint (45% had back pain and 34% had headaches) in patients with PTSD reporting physical symptoms [52]. In Vietnam veterans with PTSD [6], 80% reported the presence of a chronic-pain condition. Nearly 60% of 543 veterans treated for PTSD had medical problems including 1 in 4 with some type of musculoskeletal or pain problem [81].

Having pain and PTSD makes both problems worse. Patients with chronic pain and PTSD report having more intense pain and distress [27], [73], higher life interference [74], and greater disability than patients who had pain without PTSD [66]. Patients with PTSD and traumatic headache pain [34] had higher levels of depression than patients who had pain without PTSD [15]. In one significant study, patients with post-traumatic headache (the most common chronic pain following TBI) generally reported having more frequent pain and had poorer prognoses than patients with non-traumatic headache [51]. In another study, patients with PTSD and post-traumatic headache pain had higher levels of depression than patients who had non-PTSD post-traumatic headache pain [15]. Thus, the co-occurrence of PTSD and chronic pain may worsen either or both conditions. This continues to be an active area of research, especially in the Military [57], [64].

## **10.5 TRAUMATIC BRAIN INJURY AND wrTSR**

Traumatic Brain Injury (TBI) is a major cause of death and disability in young people. More than 5 million Americans are affected annually at a cost of nearly \$50 billion [2], [47], [50]. The VA and Military hospitals have admitted more than 7,000 non-combat patients for TBI annually [79], [80]. Twenty-eight percent of battle injuries requiring emergency evacuation include TBI [79]. Trauma to the head and neck occurs in 15% – 20% of battle injuries, and mild TBI may afflict up to 28% of all deployed war fighters [79], [80]. More than 46% of patients with blast-related injuries and 55% of amputees at Walter Reed Bethesda have sustained brain injuries [16], [21].

Symptoms and dysfunction resulting from mild to moderate TBI (mTBI) cross the entire spectrum of wrTSRs including physical symptoms, cognitive dysfunction, and psychologic or behavioral problems [11], [17], [75]-[77]. Patients admitted to the hospital for non-head injuries may have sustained unrecognized concussive brain injuries. The mechanisms and manifestations of TBI from combat blast injury seem to have different and more complex characteristics than blunt head injury [54], [55].

Military personnel may have one or more unique sets of demographic factors that cause injuries to manifest in particular ways. This patient population is younger, tends to have multiple, compound traumas, and requires acute and long-term treatment that is both curative and palliative [29]. In addition, Military Kevlar head-and-torso-protective equipment has undergone significant improvements that have reduced combat-related mortality. This improved protective gear has meant increased survivability following improvised explosive device-induced injuries, including limb fractures, penetrating projectile wounds, traumatic amputation(s), compression/crush injuries, and concussive injuries [79]. Finally, external blast-TBI in Military settings is more often accompanied by skull fractures, subsequent seizures and limb amputation(s) [79], [80]. Post-concussive symptoms occur at increased frequency in warriors, compared to civilian populations [79]. mTBI sustained in battle is often

accompanied by PTSD. mTBI and PTSD often manifest with similar sets of symptoms and dysfunction, and may be hard to distinguish [70].

## 10.6 FAILURE TO ADDRESS THE wrTSR ADEQUATELY

The wrTSR complex often manifests following treatment with signs and symptoms reflective of progression along this spectrum in Military personnel [77]. This progression may be the result of interactions from social, familial, occupational, and/or economic stressors, and launches a patient down a slippery slope of treatment failure, worsening symptoms, stress, and life disruption [17].

Our increasingly sub-specialized healthcare delivery system classifies patients into categories based on mind, brain, or bodily damage, and sends patients to psychiatry, neurology, rehabilitation medicine, etc., to address isolated components of the wrTSR. This complicates the coordination of care and places additional burdens on patients and their families. Often, patients simply do not show up for care (especially for visits that carry social stigmas) or show up repeatedly in primary care clinics with somatic, non-specific complaints about sleep, appetite, energy and/or sexual activity. The former behavior results in under-diagnosis and treatment, and the latter behavior increases the burden on primary care to treat “sub-threshold” PTSD or mTBI, which may go undiagnosed or treated ineffectively [28]. These patients may present weeks to months after trauma exposure and chronically burden the Defense or veteran’s healthcare delivery systems [11], [78]. This situation is incompatible with the best practice of medicine and calls for a more efficient and holistic approach to addressing the full consequences of the wrTSR.

## 10.7 THE NEED FOR A WHOLE-PERSON WRTSR STRATEGY

The data presented in this article point to a large and growing clinical problem [39] and the need for “the development of intervention based on a new integrated care model” [67]. In addition, the impact of these mind, brain or body injuries goes far beyond individuals, affecting their families and communities and the healthcare system [28]. Thus, from the perspective of each person, family and community, there is good reason to investigate integrative, multi-dimensional (mind, body, symptom, function) approaches to wrTSR. The current standards of care for wrTSR are not maximally effective, nor do they address the full biopsychosocial spectrum of wrTSR. Thus, there is a need to define and understand the wrTSR more completely and to develop interventions based upon new integrative care models. Such care should address the whole person and seek to facilitate healing as an integrated paradigm [78].

## 10.8 COMPLEMENTARY AND INTEGRATIVE MEDICINE PRACTICES

Because they tend to be holistic and seek to induce salutogenic solutions to recovery and reintegration, complementary and integrative approaches may address many of these challenges and offer long-term healing for Service Members [41]. Complementary and Integrative Medicine (CIM) involves holistic practices used in conjunction with conventional medicine that are designed to enhance healing, stimulate recovery and reduce side-effects. Complementary and IM therapies are increasingly used as part of comprehensive care models [4] and may offer major contributions to recovery and healing.

Surveys have shown that up to 70% of Department of Defense (DoD) beneficiaries use complementary and IM [53]. A large survey of Active Duty Military members conducted by the Samuel Institute, in conjunction with the DoD Health Behaviors Survey showed that > 45% used complementary and IM and more than two-thirds used dietary and nutritional supplements in a 12-month period. Surveys, such as the Klemm [42] and

HAIG [35] reports, showed extensive use of complementary and IM by Veterans Health Administration practitioners [45]. The wide acceptance of complementary and IM suggests that, were a particular complementary and IM approach to prove effective for addressing PTSD; many people who avoid psychiatric treatment might use it [49]. Current research is shifting from management and mitigation of PTSD to examining ways to promote posttraumatic adaptation, development, and growth. This is consistent with trends in mental health research showing:

- 1) A broader view of the positive psychology movement;
- 2) Recognition of the role of spirituality and religion in health and well-being; and
- 3) A broader view of stress-related and post-traumatic growth [1].

Research by Samueli Institute and partners on the use of optimal healing environments for the treatment and prevention of the negative effects of wrTSR demonstrates this [60].

Complementary and IM approaches fall into two basic categories:

- 1) Self-care approaches; and
- 2) Drugless treatments delivered by practitioners.

### **10.8.1 Self-Care**

Self-care encompasses actions people do for themselves that enhance self-care and self-treatment skills, such as:

- Mind/body practices [31] (imagery, relaxation response [8], mindfulness training [33], yoga [62]);
- Self-care skills (community self-care practices, diet and exercise training);
- Device-assisted biofeedback (heart-rate monitoring, breathing, virtual reality); and
- Diet and supplements for enhancing cognitive/physical fitness and psychologic resilience.

Samueli Institute completed a large set of systematic reviews on self-care complementary and IM for addressing chronic pain [13]. Current evidence favors the use of yoga, tai chi, and music for treating chronic pain.

### **10.8.2 Drugless Treatments**

Drugless treatments encompass non-drug and non-psychiatric approaches that are used by complementary professionals to complement conventional treatments and facilitate healing, such as acupuncture [30], [58], Reiki, osteopathic manipulation [19], chiropractic and integrative medicine team approaches. Samueli Institute has performed a comprehensive systematic review of acupuncture for the full spectrum of the wrTSR [48].

Complementary and IM approaches are often of a different nature than symptom-based treatments for isolated manifestations of the wrTSR. These practices can result in healing and recovery of the entire spectrum of symptoms and dysfunction of wrTSR simultaneously. In addition, once reduced, these dysfunctions tend to remain improved without further treatment. When self-care skills and practices have been acquired, the result may be permanently empowered patients with skills to treat and manage their symptoms with minimal or no further professional input. For example, Battlefield Acupuncture involves the insertion of ear studs to allow patients to take control of the frequency and intensity of point stimulation [22], [30]. In studies of acupuncture, healing touch and guided imagery for PTSD, these approaches resulted in reduction of all symptoms and dysfunctions of the wrTSR and reduction in the need for medications [22], [40]. Symptoms continued to be improved even when the interventions were stopped, which is a hallmark of true healing and recovery.

## 10.9 CONCLUSIONS

We need better and more-holistic approaches for healing the wrTSR. Complementary and IM is not just another set of disease treatments; rather, it includes tools to induce permanent healing in a whole person. If we are to truly help and heal our Service Members suffering the consequences of more than a decade of war, we must place a much greater emphasis on research and implementation of these whole-person healing practices. We need to invest in making healing as important as curing.

## 10.10 RECOMMENDATIONS

- 1) Military medicine should make a clear distinction between “pathogenic” and “salutogenic” approaches for managing the wrTSR.
- 2) Whole-person approaches that do not separate the components of the wrTSR into distinct treatment processes are needed.
- 3) A person-centric approach to the wrTSR and reintegration after deployment is needed.
- 4) The Military should place a much greater emphasis and investment in both research and practice seeking strategies that accelerate salutogenesis seeking to “reset” and permanently heal Service Members after deployment.
- 5) Strategies that coordinate all services, such as the U.S. DoD Total Force Fitness framework, should be developed and standardized.
- 6) Society should fulfill its social contract with individuals who are sent to war, guaranteeing that all become successful to their maximum capacity when they return.
- 7) Integrative healthcare approaches can play a key role in that success and need greater investment by the public and private sectors.

## 10.11 REFERENCES

- [1] Ai, A.L. and Park, C.L. Possibilities of the positive following violence and trauma: informing the coming decade of research. *J Interpers Violence*. 2005;20(2):242-50.
- [2] Armed Forces Health Surveillance Center. Traumatic brain injury among members of active components, US Armed Forces, 1997-2006. *MSMR*: A publication of the Armed Forces Health Surveillance Center 2007;14(5):2-7.
- [3] Asmundson, G.J., Norton, G.R., Allerdings, M.D., Norton, P.J. and Larsen, D.K. Posttraumatic stress disorder and work-related injury. *J Anxiety Disord*. 1998;12(1):57-69.
- [4] Barnes, P., Powell-Griner, P., McFann, K. and Nahin, R. Complementary and Alternative Medicine use among adults: United States, 2002. *Advance data from vital and health statistics; no 343*. Hyattsville, Maryland: National Center for Health Statistics, 2002.

- [5] Beck, J., Palyo, S., Winer, E., Schwagler, B. and Ang, E. Virtual Reality Exposure Therapy for PTSD symptoms after a road accident: an uncontrolled case series. *Behavior Therapy*. 2007;38(1):39-48.
- [6] Beckham, J.C., Crawford, A.L., Feldman, M.E., Kirby, A.C., Hertzberg, M.A., Davidson, J.R. and Moore, S.D. Chronic posttraumatic stress disorder and chronic pain in Vietnam combat veterans. *J Psychosom Res*. 1997;43(4):379-89.
- [7] Benedikt, R.A. and Kolb, L.C. Preliminary findings on chronic pain and posttraumatic stress disorder. *Am J Psychiatry*. 1986;143(7):908-10.
- [8] Benson, H., Greenwood, M.M. and Klemchuk, H. The relaxation response: psychophysiological aspects and clinical applications. *International journal of psychiatry in medicine*. 1975;6(1-2):87-98.
- [9] Berlim, M., Perizzolo, J. and Fleck, M. Posttraumatic stress disorder and major depression. *Rev Bras Psiquiatr*. 2003;25(1):51-4.
- [10] Bleich, A., Koslowsky, M., Doley, A. and Lerer, B. Post-Traumatic Stress Disorder and depression. An analysis of comorbidity. *British Journal of Psychiatry* 1997;170:479-82.
- [11] Bolzenius, J.D., Roskos, P.T., Salminen, L.E., Paul, R.H. and Bucholz, R.D. Cognitive and self-reported psychological outcomes of blast-induced mild traumatic brain injury in veterans: a preliminary study. *Applied neuropsychology. Adult* 2015;22(2):79-87.
- [12] Brady, K., Killeen, T., Brewerton, T. and Lucerini, S. Comorbidity of psychiatric disorders and Posttraumatic Stress Disorder. *Journal of Clinical Psychiatry*. 2000;61(7):22-32.
- [13] Buckenmaier, C., Crawford, C., Lee, C. and Schoomaker, E. Special Issue: Are Active Self-Care Complementary and Integrative Therapies Effective for Management of Chronic Pain? A Rapid Evidence Assessment of the Literature and Recommendations for the Field. *Pain Med*. 2014; Supplement S1:S1-S113.
- [14] Centers for Disease Control and Prevention. Health status of Vietnam veterans. I. Psychosocial characteristics. The Centers for Disease Control Vietnam Experience Study. *JAMA*. 1988;259(18): 2701-07.
- [15] Chibnall, J.T. and Duckro, P.N. Post-traumatic stress disorder in chronic post-traumatic headache patients. *Headache* 1994;34(6):357-61.
- [16] Clark, M.E., Bair, M.J., Buckenmaier, C.C., 3rd, Gironda, R.J. and Walker, R.L. Pain and combat injuries in soldiers returning from Operations Enduring Freedom and Iraqi Freedom: Implications for research and practice. *J Rehabil Res Dev*. 2007;44(2):179-94.
- [17] Cogan, A.M. Occupational needs and intervention strategies for military personnel with mild traumatic brain injury and persistent post-concussion symptoms: a review. *OTJR: (Thorofare, N.J.)*. 2014;34(3):150-9.
- [18] Coulter, I., Ellison, M., Hilton, L., Rhodes, H. and Ryan, G. *Hospital-Based Integrative Medicine: A Case Study of the Barriers and Factors Facilitating the Creation of a Center*. Santa Monica, CA, USA: RAND Corporation, 2008.

- [19] Cutler, M.J., Holland, B.S., Stupski, B.A., Gamber, R.G. and Smith, M.L. Cranial manipulation can alter sleep latency and sympathetic nerve activity in humans: a pilot study. *J Altern Complement Med.* 2005;11(1):103-8.
- [20] Davidson, J., Kudler, H., Saunders, W. and Smith, R. Symptom and comorbidity patterns in world war II and Vietnam veterans with Posttraumatic Stress Disorder. *Compr Psychiatry.* 1990;31:162-70.
- [21] Traumatic brain injury planning conference. National Conference Center; 2007 June 25-26; Lansdowne, VA, USA.
- [22] Engel, C.C., Cordova, E.H., Benedek, D.M., Liu, X., Gore, K.L., Goertz, C., Freed, M.C., Crawford, C., Jonas, W.B. and Ursano, R.J. Randomized effectiveness trial of a brief course of acupuncture for posttraumatic stress disorder. *Medical care* 2014;52(12 Suppl 5):S57-64.
- [23] Engelhard, I.M., Huijding, J., van den Hout, M.A. and de Jong, P.J. Vulnerability associations and symptoms of post-traumatic stress disorder in soldiers deployed to Iraq. *Behav Res Ther.* 2007.
- [24] Erbes, C., Westermeyer, J., Engdahl, B. and Johnsen, E. Post-traumatic stress disorder and service utilization in a sample of service members from Iraq and Afghanistan. *Mil Med.* 2007;172(4):359-63.
- [25] Forbes, D., Creamer, M., Hawthorne, G., Allen, N. and McHugh, T. Comorbidity as a predictor of symptom change after treatment in combat-related Posttraumatic Stress Disorder. *J Nerv Ment Dis.* 2003;191(2):93-99.
- [26] Gayle Beck, J., Gudmundsdottir, B. and Shipherd, J. PTSD and emotional distress symptoms measured after a motor vehicle accident: Relationship with pain coping profiles. *J Psychopathol Behav Assess* 2003;54(4):219-27.
- [27] Geisser, M.E., Roth, R.S., Bachman, J.E. and Eckert, T.A. The relationship between symptoms of post-traumatic stress disorder and pain, affective disturbance and disability among patients with accident and non-accident related pain. *Pain.* 1996;66(2-3):207-14.
- [28] Giordano, J. Changing the practice of pain medicine writ large and small through identifying problems and establishing goals. *Pain Physician.* 2006;9(4):283-5.
- [29] Gironda, R.J., Clark, M.E., Massengale, J.P. and Walker, R.L. Pain among veterans of Operations Enduring Freedom and Iraqi Freedom. *Pain Med.* 2006;7(4):339-43.
- [30] Goertz, C., Niemtzow, R., Burns, S., Fritts, M., Crawford, C. and Jonas, W.B. Auricular acupuncture in the treatment of acute pain syndromes: A pilot study. *Mil Med.* 2006;171(10):1010-14.
- [31] Gordon, J.S., Staples, J.K., Blyta, A. and Bytyqi, M. Treatment of posttraumatic stress disorder in postwar Kosovo high school students using mind-body skills groups: a pilot study. *J Trauma Stress.* 2004; 17(2):143-7.
- [32] Grinage, B.D. Diagnosis and management of post-traumatic stress disorder. *Am Fam Physician.* 2003;68(12):2401-8.
- [33] Grossman, P., Niemann, L., Schmidt, S. and Walach, H. Mindfulness-based stress reduction and health benefits. A meta-analysis. *J Psychosom Res.* 2004;57(1):35-43.

[34] Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache Disorders, 3<sup>rd</sup> edition (beta version). [Internet]. [http://www.ihc-classification.org/\\_downloads/mixed/International-Headache-Classification-III-ICHD-III-2013-Beta.pdf](http://www.ihc-classification.org/_downloads/mixed/International-Headache-Classification-III-ICHD-III-2013-Beta.pdf). Cephalgia. 2013;33:629-808.

[35] Healthcare Analysis and Information Group (HAIG). Complementary and Alternative Medicine Report. Washington, DC, USA: Department of Veterans Affairs; 2002.

[36] Hickling, E.J. and Blanchard, E.B. Post-traumatic stress disorder and motor vehicle accidents. *J Anxiety Disord* 1992(6):285-91.

[37] Hoge, C.W., Castro, C.A., Messer, S.C., McGurk, D., Cotting, D.I. and Koffman, R.L. Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *N Engl J Med*. 2004;351(1):13-22.

[38] Hoge, C.W., Auchterlonie, J.L. and Milliken, C.S. Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *JAMA*. 2006;295(9):1023-32.

[39] [icasualties.org](http://icasualties.org). Iraq coalition casualty count. Secondary Iraq coalition casualty count. [Internet]. <http://icasualties.org>.

[40] Jain, S., McMahon, G.F., Hasen, P., Kozub, M.P., Porter, V., King, R. and Guarneri, E.M. Healing Touch with Guided Imagery for PTSD in returning active duty military: a randomized controlled trial. *Mil Med*. 2012;177(9):1015-21.

[41] Jonas, W.B., Chez, R.A., Smith, K. and Sakallaris, B. Salutogenesis: the defining concept for a new healthcare system. *Global advances in health and medicine: improving healthcare outcomes worldwide* 2014;3(3):82-91.

[42] Klemm Analysis Group. Alternative Medicine Therapy: Assessment of Current VHA Practices and Opportunities. Washington, DC, USA: Department of Veterans Affairs; 1999.

[43] Kofoed, L., Friedman, M.J. and Peck, R. Alcoholism and drug abuse in patients with PTSD. *Psychiatr Q*. 1993;64(2):151-71.

[44] Kozaric-Kovacic, D. and Borovecki, A. Prevalence of psychotic comorbidity in combat-related post-traumatic stress disorder. *Mil Med*. 2005;170(3):223-6.

[45] Kroesen, K., Baldwin, C.M., Brooks, A.J. and Bell, I.R. US military veterans' perceptions of the conventional medical care system and their use of complementary and alternative medicine. *Fam Pract*. 2002;19(1):57-64.

[46] Kulka, R. *Trauma and the Vietnam War Generation: Report of Findings From the National Vietnam Veterans Readjustment Study*. New York: Brunner/Mazel, 1990.

[47] Langlois, J. Traumatic brain injury in the United States: Assessing outcomes in children. Atlanta, GA, USA: National Center for Injury Prevention and Control of the Centers for Disease Control and Prevention, 2001.

- [48] Lee, C., Crawford, C., Wallerstedt, D., York, A., Duncan, A., Smith, J., Sprengel, M., Welton, R. and Jonas, W. The effectiveness of acupuncture research across components of the trauma spectrum response (tsr): a systematic review of reviews. *Syst Rev.* 2012;1:46.
- [49] Levine, E.G., Eckhardt, J. and Targ, E. Change in post-traumatic stress symptoms following psychosocial treatment for breast cancer. *Psychooncology.* 2005;14(8):618-35.
- [50] Lewin, J. and Sumners, D. Anorexia due to brain injury. *Brain Inj.* 1992;6(2):199-201.
- [51] Marcus, D.A. Disability and chronic posttraumatic headache. *Headache.* 2003;43(2):117-21.
- [52] McFarlane, A.C., Atchison, M., Rafalowicz, E. and Papay, P. Physical symptoms in post-traumatic stress disorder. *J Psychosom Res.* 1994;38(7):715-26.
- [53] McPherson, F. and Schwenka, M.A. Use of complementary and alternative therapies among active duty soldiers, military retirees, and family members at a military hospital. *Mil Med.* 2004;169(5):354-7.
- [54] Mendez, M.F., Owens, E.M., Jimenez, E.E., Peppers, D. and Licht, E.A. Changes in personality after mild traumatic brain injury from primary blast vs. blunt forces. *Brain Inj.* 2013;27(1):10-8.
- [55] Mendez, M.F., Owens, E.M., Reza Berenji, G., Peppers, D.C., Liang, L.J. and Licht, E.A. Mild traumatic brain injury from primary blast vs. blunt forces: post-concussion consequences and functional neuroimaging. *NeuroRehabilitation.* 2013;32(2):397-407.
- [56] Muse, M. Stress-related, posttraumatic chronic pain syndrome: behavioral treatment approach. *Pain.* 1986;25(3):389-94.
- [57] Neely, E.T., Midgette, L.A. and Scher, A.I. Clinical review and epidemiology of headache disorders in US service members: with emphasis on post-traumatic headache. *Headache.* 2009;49(7):1089-96.
- [58] Niemtzow, R. Battlefield Acupuncture. *Med Acupunct.* 2007;19(4):225-28.
- [59] Oquendo, M.A., Friend, J.M., Halberstam, B., Brodsky, B.S., Burke, A.K., Grunbaum, M.F., Malone, K.M. and Mann, J.J. Association of comorbid posttraumatic stress disorder and major depression with greater risk for suicidal behavior. *Am J Psychiatry.* 2003;160(3):580-2.
- [60] Osuch, E. and Engel, C.C., Jr. Research on the treatment of trauma spectrum responses: the role of the optimal healing environment and neurobiology. *J Altern Complement Med.* 2004;10 Suppl 1:S211-21.
- [61] Potash, M. Chronic pain and co-morbid brain injury from IED trauma. *Prac Pain Management.* 2007;7(5):12-17.
- [62] Raub, J.A. Psychophysiological effects of Hatha Yoga on musculoskeletal and cardiopulmonary function: a literature review. *J Altern Complement Med.* 2002;8(6):797-812.
- [63] Riggs, D.S., Rukstalis, M., Volpicelli, J.R., Kalmanson, D. and Foa, E.B. Demographic and social adjustment characteristics of patients with comorbid posttraumatic stress disorder and alcohol dependence: potential pitfalls to PTSD treatment. *Addict Behav.* 2003;28(9):1717-30.

- [64] Scher, A.I. and Monteith, T.S. Epidemiology and classification of post-traumatic headache: what do we know and how do we move forward? Comment on Lucas et al., "Prevalence and characterization of headache following mild TBI". *Cephalgia*. 2014;34(2):83-5.
- [65] Shalev, A.Y., Freedman, S., Peri, T., Brandes, D., Sahar, T., Orr, S.P. and Pitman, R.K. Prospective study of posttraumatic stress disorder and depression following trauma. *Am J Psychiatry*. 1998;155(5):630-7.
- [66] Sherman, J.J., Turk, D.C. and Okifuji, A. Prevalence and impact of posttraumatic stress disorder-like symptoms on patients with fibromyalgia syndrome. *Clin J Pain*. 2000;16(2):127-34.
- [67] Shipherd, J.C., Keyes, M., Jovanovic, T., Ready, D.J., Baltzell, D., Worley, V., Gordon-Brown, V., Hayslett, C. and Duncan, E. Veterans seeking treatment for posttraumatic stress disorder: What about comorbid chronic pain? *J Rehabil Res Dev*. 2007;44(2):153-66.
- [68] Sonne, S.C., Back, S.E., Diaz Zuniga, C., Randall, C.L. and Brady, K.T. Gender differences in individuals with comorbid alcohol dependence and post-traumatic stress disorder. *Am J Addict*. 2003;12(5):412-23.
- [69] Stein, D.J., Bandelow, B., Hollander, E., Nutt, D.J., Okasha, A., Pollack, M.H., Swinson, R.P. and Zohar, J. WCA Recommendations for the long-term treatment of posttraumatic stress disorder. *CNS Spectr*. 2003;8(8 Suppl 1):31-9.
- [70] Taber, K., Warden, D. and Hurley, R. Blast-related traumatic brain injury: What is known? *J Neuropsychiatry Clin Neurosci*. 2006;18:141-45.
- [71] Taylor, S. and Koch, W.J. Anxiety disorders due to motor vehicle accidents: Nature and treatment. *Clin Psychol Rev*. 1995;15(5):721-38.
- [72] Toblin, R.L., Quartana, P.J., Riviere, L.A., Walper, K.C. and Hoge, C.W. Chronic pain and opioid use in US soldiers after combat deployment. *JAMA Intern Med*. 2014;174(8):1400-1.
- [73] Toomey, T.C., Seville, J.L., Abashian, S.W., Finkel, A.G. and Mann, J.D. Circumstances of chronic pain onset: Relationship to pain description, coping and psychological distress [abstract]. Miami Beach, FL, USA: American Pain Society, 1994.
- [74] Turk, D.C., Okifuji, A., Starz, T.W. and Sinclair, J.D. Effects of type of symptom onset on psychological distress and disability in fibromyalgia syndrome patients. *Pain*. 1996;68(2-3):423-30.
- [75] Vanderploeg, R.D., Curtiss, G. and Belanger, H.G. Long-term neuropsychological outcomes following mild traumatic brain injury. *J Int Neuropsychol Soc*. 2005;11(3):228-36.
- [76] Vanderploeg, R.D., Curtiss, G., Luis, C.A. and Salazar, A.M. Long-term morbidities following self-reported mild traumatic brain injury. *J Clin Exp Neuropsychol*. 2007;29(6):585-98.
- [77] Vanderploeg, R.D., Belanger, H.G. and Curtiss, G. Mild traumatic brain injury and posttraumatic stress disorder and their associations with health symptoms. *Arch Phys Med Rehabil*. 2009;90(7):1084-93.
- [78] Villano, C., Rosenblum, A. and Magura, S. Prevalence and correlate of posttraumatic stress disorder and chronic severe pain in psychiatric outpatients. *J Rehab Research Devel* 2007;44(2):167-78.

- [79] Warden, D. Military TBI during the Iraq and Afghanistan wars. *J Head Trauma Rehabil.* 2006;21(5):398-402.
- [80] Warden, D.L. and French, L. Traumatic brain injury in the war zone. *N Engl J Med.* 2005;353(6):633-4.
- [81] White, P. and Faustman, W. Coexisting physical conditions among inpatients with post-traumatic stress disorder. *Mil Med.* 1989;154(2):66-71.
- [82] Zlotnick, C., Warshaw, M., Shea, M., Allsworth, J., Pearlstein, T. and Keller, M. Chronicity in Posttraumatic Stress Disorder (PTSD) and prediction of course of comorbid PTSD in patients with anxiety disorders. *J Trauma Stress.* 1999;12(1):89-100.



## Chapter 11 – SYSTEMATIC APPROACHES TO EVALUATION AND INTEGRATION OF EASTERN AND WESTERN MEDICAL PRACTICES

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### **ABSTRACT**

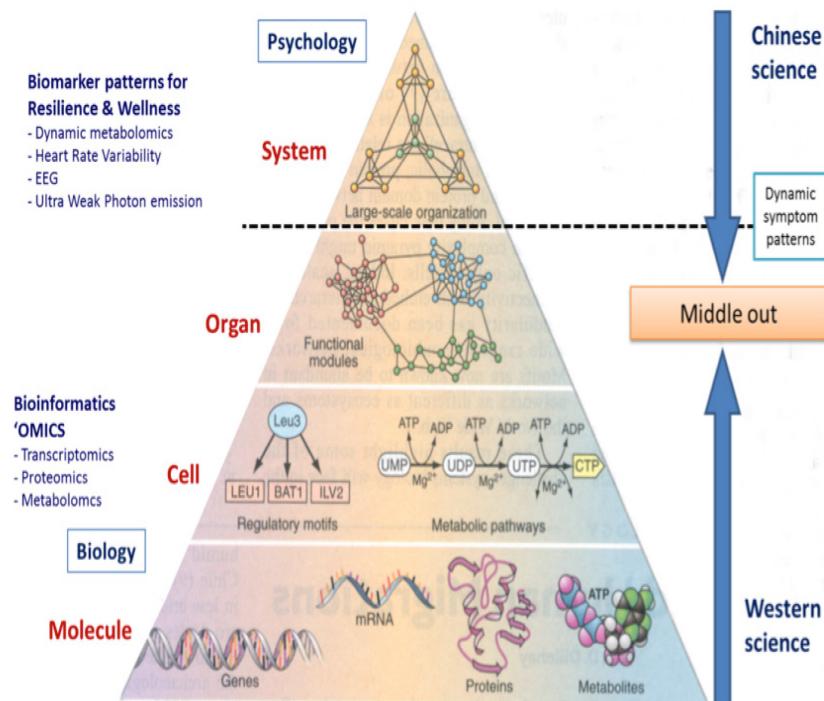
*The current health-care system faces increasing costs and demands while the presence of chronic conditions in the general populations is rising. A shift from disease fighting toward health promotion is needed to prevent these conditions and empower people to work on their own health. In the Military setting, health promotion is equally important. Many Veterans are returning from missions with traumatic experiences. Therefore, in the field of mental health, it is also important to focus on building mental resilience before deployment, instead of starting treating after the damage is done. Throughout the ages, Eastern medicine systems have developed different views on health, disease, and resilience. These systems generally focus more on health promotion and strengthening the self-healing properties of the body, and are, therefore, complementary to Western medical developments. A better understanding and integration of those complementary views might reveal new avenues for treatments. In this chapter, Chinese Medicine, Ayurveda, and endobiogeny thinking are reviewed. Examples are then given of how systems biology can be applied to study Eastern medicine systems and reveal biologic information about certain diagnostic principles. These examples show how combined Western and Eastern diagnosis can be used to discover new patient sub-types. Those sub-types can then be used to study responses to medications and lifestyle interventions, leading toward personalized treatment in the future. Different studies open a field of exploration to combine systems biology into global health practice. This review shows that systems biology is successful in revealing biologic information about Eastern medicine practices. This new comprehensive approach, bridging the East and the West, creates novel opportunities for Military health care systems. More targeted and personalized treatment options can be developed for Soldiers, as well as novel health-promotion strategies based on foods, herbs, acupuncture, and other modalities.*

*Keywords: Ayurgenomics, Ayurveda, Systems Biology, Macrocosm, Microcosm, Traditional Chinese Medicine.*

## 11.1 INTRODUCTION

Various cultures across the globe have given rise to a variety of sciences, resulting in different medical practices. Each of these medical systems makes use of particular concepts of health, wellness, resilience, and healing. In Western medicine, health is currently redefined as the ability to adapt and self-manage in the face of social, physical, and emotional challenges [7]. In Chinese and Indian medicine, the concept of health is more related to being one with nature and the rhythms of life. An integration of medical systems is needed to take full advantage of the various viewpoints and enlarge our understanding of resilience, wellness, health, and the means of promoting health and resilience [12].

Western and Asian medicine apply very different methods for assessing health. Western science is very good at measuring molecules and has generally followed a bottom-up approach with regard to the pyramid of life described by Oltvai and Barabási [10] (Figure 11-1). Elucidating higher levels of system organization is the concern of psychology. Overcoming the mind/body divide has proven to be very difficult. Knowledge of health and maintaining health is very limited, compared to the knowledge that has been gained about the molecular basis of diseases.



Oltvai et al Science 298 (2002) 763

**Figure 11-1: A Representation of Levels of System Organization, Techniques for Measuring these Levels of Organization, and the Convergence of Chinese and Western Science. EEG, (Electroencephalograph); LEU; BAT; ILV; ATP (Adenotriphosphate); ADP (Adenosine Diphosphate); UMP (Uridine Monophosphate); UDP (Uridine Diphosphate); UTP (Uridine Triphosphate); CTP (Cytidine Triphosphate). Adapted from Oltvai and Barabási, 2002, with permission from American Association for the Advancement of Science (AAAS).**

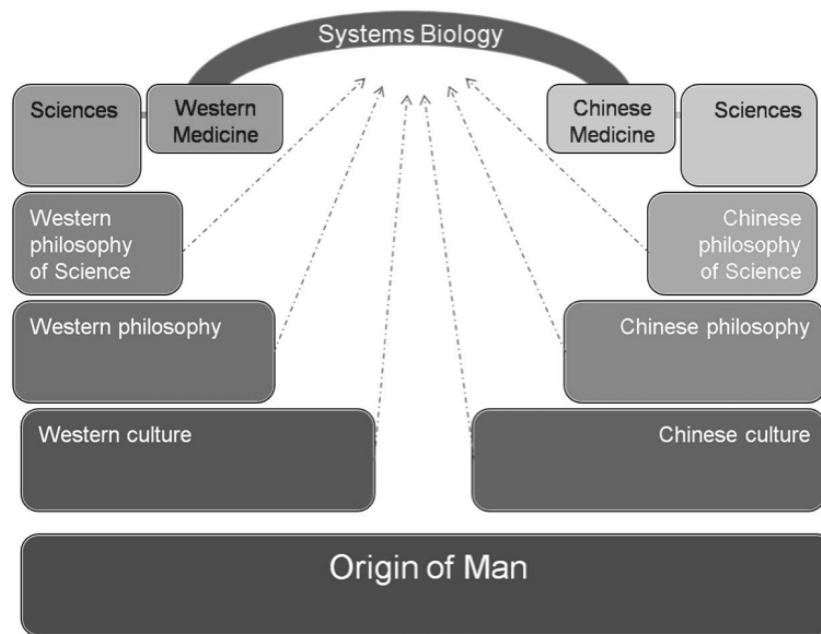
Asian medicine systems on the contrary have evolved as *top-down* approaches, phenomenological approaches, based on the organization and dynamics of symptom patterns. These dynamic symptom patterns consist of both physical as well as mental aspects, because the mind/body split has never occurred in Asian medicine. Therefore, Asian medicine provides an excellent opportunity to reconcile the body and mind in Western medicine. A half a decade ago, significant steps were taken to develop what is called *middle-out* approach toward integration of measurements of these diverse levels of system organization [13].

In this chapter, various cultures of medicine are described briefly, within a systems medicine context. Then, approaches to scientific evaluation and integration of various systems of medicine are discussed and illustrated with some examples from recent scientific literature.

## **11.2 WESTERN AND EASTERN SCIENCES**

When we use the word *science*, there is no need for explanation. Every reader, anywhere in the world, will immediately assume that we are talking about the methodology used in the last 400 years and based on the ideas of Newton and Descartes, to try to understand our reality. Medicine is part of this scientific thinking. What makes science are the rules that scientific philosophers such as Kühne and Popper have defined. However, what gave them the authority to devise these rules – that is, the embedding of their ideas in the Western cultural philosophy, which is rooted in our Western civilization?

If we were to conclude that there is only one science, the subsequent conclusion would also, necessarily, be that there is only one civilization in this world. If we were to assume that this was not the case, we could do the previous thinking exercise in reverse. Let us take a random civilization: the Chinese civilization. Do they have cultural philosophers? Lao Zi, Kong Zi, Mo Zi ... So they have. Do they also have scientific philosophers? Yang Hui, Li Shizhen, Fung Yulan ... Given that they do have scientific philosophers, who formulated ideas about how to approach and examine our reality? In addition, would it not be logical that these ideas were totally different from Western ones because of their different cultural bases? So, the Chinese approach to health and healing would also be different from our Western approach. To understand the methodology of Chinese medicine, we have to find a way to bridge the gap between the two paradigms [13] (Figure 11-2).



**Figure 11-2: Systems Biology as a Bridge Between Chinese and Western Medicine.** As migration moved populations apart in space and time, the Western and Chinese cultures evolved separately, giving rise to specific cultural philosophies. These philosophies gave rise to philosophies of science, which led to types of science. This evolution allowed different types of science to exist alongside one another. Figure reproduced from van der Greef [13].  
Reprinted with permission from © Georg Thieme Verlag KG.

Chinese medicine is not object-oriented but is much more interested in the relationships between objects. In addition, Chinese medicine is much more focused on the quality than on the quantity of measurements. What Chinese medicine does is map patterns of relationships, relationships among symptoms, pulse characteristics, tongue features, and other factors. These are the exact characteristics of systems thinking – a new scientific way of thinking developed in the West after World War II, characterized by mapping relationships. Could this systems' thinking be the bridge, the meta-language, between Western medicine and other systematic medical systems?

### 11.3 AYURVEDA: A SYSTEMS SCIENCE

Ayurveda, one of the oldest medical systems in the world, can bring new keys to understanding the complexity of health. *Ayur* means *life* in Sanskrit. *Veda* means *science* or *knowledge*. Ayurveda developed ~ 3,000 years BC and was organized into eight different branches:

- 1) General medicine;
- 2) Pediatrics (including Cesarean sections for mothers);
- 3) Psychiatric treatment;
- 4) Ophthalmology (including cataract surgery);
- 5) Surgery;
- 6) Toxicology;

- 7) Rejuvenation treatment (geriatrics); and
- 8) Sexology.

Ayurveda is based on the body type of the individual that has to be taken into account, as well as the environment the person lives in, to determine a specific treatment for that individual patient.

According to Ayurvedic knowledge, the human being is the microcosmos, which is completely interconnected with his or her environment, the macrocosmos. Healthy relationships among every living system are primordial for global health, because everything is made of the five basic elements:

- Space;
- Air;
- Fire;
- Water; and
- Earth.

In today's language, a rough translation would be: carbon, hydrogen and oxygen atoms that are omnipresent in living and non-living forms.

Ancient texts [11] emphasize the importance of taking care of health before disease occurs, which would be proof of an imbalance of the body's original state. This is represented today by the term allostasis, which is explained in more detail in the following section. The aim of Ayurvedic treatment is to help a patient transition from a disease state to an allostatic state, or even to homeostasis, following the dynamic functional changes of the person's type.

It is worthwhile to focus a little bit more on the mechanisms of Ayurveda. An interesting view of these ancient texts is the concept that every human being is unique, and the physiology of each biologic system is ruled by forces – or doshas – that could be translated into functional phenotypes. In order to go a bit deeper into Ayurvedic diagnosis, it is helpful to focus on the doshas, or mind/body principles that involve the five basic elements. Space and Earth give birth to the Vata dosha (Air); Fire and Water give birth to the Pitta dosha (Fire); and Water and Earth give rise to the Kapha dosha (Water). Everyone has a specific percentage of Fire-type (Pitta), a specific percentage of Water-type (Kapha) and a percentage of Air-type (Vata). It is during conception that human beings get their primary constitutions, Prakriti (Figure 11-3).

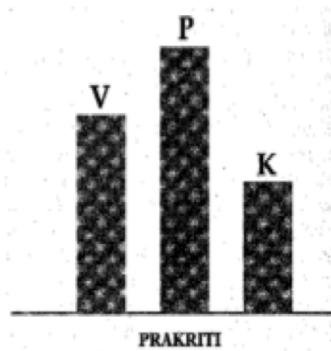


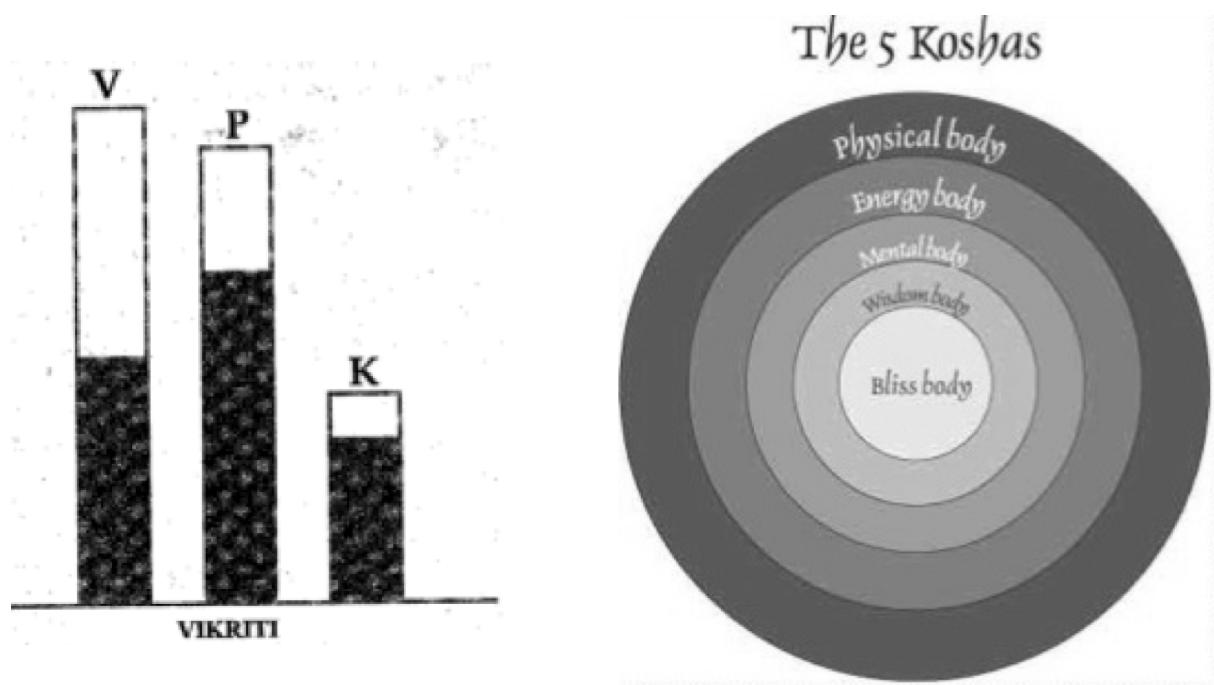
Figure 11-3: The Right Balance of the Three Forces Characterizes the Healthy Situation: Wind (V); Fire (P); and Water (K).

The force of Fire is responsible for all the digestive and metabolic processes of the body and the mind. The force of Water is the key to the structures of the body and the mind. Finally, the force of Air is the guarantee for conduction and mobility in the body and the mind (digestion peristalsis, blood circulation, nerve impulses, breathing). When we translate this into a more physiologic process, every cell has these three forces it needs:

- Structural components;
- Metabolic capacity; and
- Mobility capacity.

Other points are included in elaboration of the diagnosis, such as physical features (the quality of the tongue can also indicate dosha imbalances, as well as the study of the pulse, as in Chinese medicine). In addition to these physical semiologic features, an important part of the consultation is based on questioning regarding the patient's lifestyle and habits spanning his or her life.

With the years, and the effects of age and stressful situations, we divert from our Prakriti into a new state of imbalance known as *Vikriti* (Figure 11-4). It is opportune for disease development. The initial percentages of the three functional forces are now disturbed – whether they are increased or decreased. The whole aim of the global treatment is to use herbal medicines, massages, diet, yoga, and adaptation of the individual's environment to restore the Prakriti of the patient, in his or her *five bodies*, which are known as the *five koshas* [5] (Figure 11-5).



**Figure 11-4: The State in Which the Three Forces – Wind (V); Fire (P); and Water (K) – Are Out of Balance.**

**Figure 11-5: The Five Bodies or Five Koshas According to Ayurveda.**

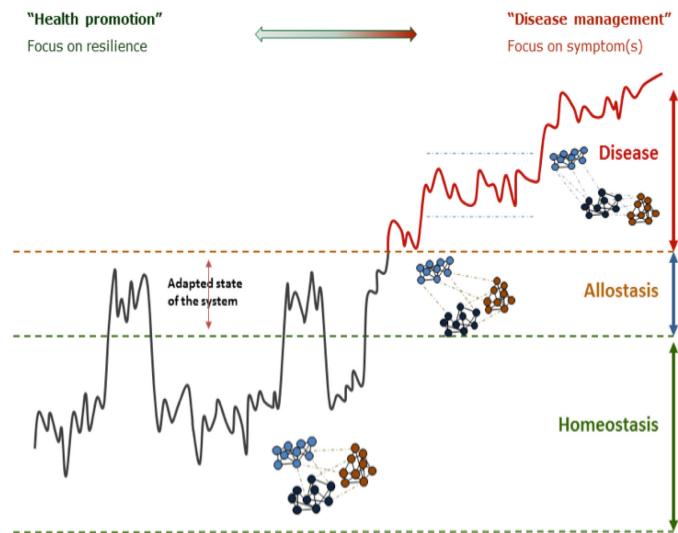
## 11.4 THE SYSTEMS BIOLOGY APPROACH TO HEALTH IN EASTERN MEDICINE

In systems biology, an organism can be considered to be a dynamic, self-organizing system [2], [6]. Not only the physiology and anatomy of the human body can be approached in this fashion – pathology also appears to be dynamically organized.

Symptoms arise in groups and create a dynamic balance. In Chinese medicine, it is said that symptoms group around virtual centers, for which poetic names, such as *Spleen Qi Deficiency* or *Liver Yang Rising*, are used in Chinese diagnosis. Ayurvedic, Tibetan, and other Asian medicine systems have their own sets of names for such virtual centers. However, these labels should not distract us, although these exotic names are far from our Western scientific reality. Statically, we can see that the grouping of the symptoms is very consistent. In addition, if a symptom appears that does not primarily belong to a stable group of symptoms, the system tends to behave chaotically. Such a symptom is called a “bridge symptom”. It brings the dynamically balanced system of a diseased body into a new dynamic steady state in which the patient can feel better or worse.

This could indicate that health is a dynamic state in which an organism’s system responds between a maximum and minimum: the homeostatic state. Actually, we could say that a person is at maximum health when that person’s dynamic self-organized system is as open as possible and exchanges the largest possible amount of information with its environment, without losing its identity.

When the system is challenged, it can go into an allostatic state in which the dynamic system is stretched to a maximum but can recuperate by itself. When the system is frequently challenged to the allostatic state, the system can adapt to that state and become part of the homeostatic state. When the system is challenged to a level that it cannot recuperate by itself, the system goes into a disease level. The system organizes itself into a new dynamic balance, which is not perceived as pleasant or healthy by the patient. When the system is not helped to make the move back into the allostatic or homeostatic state, the system will move into a next disease level (Figure 11-6).

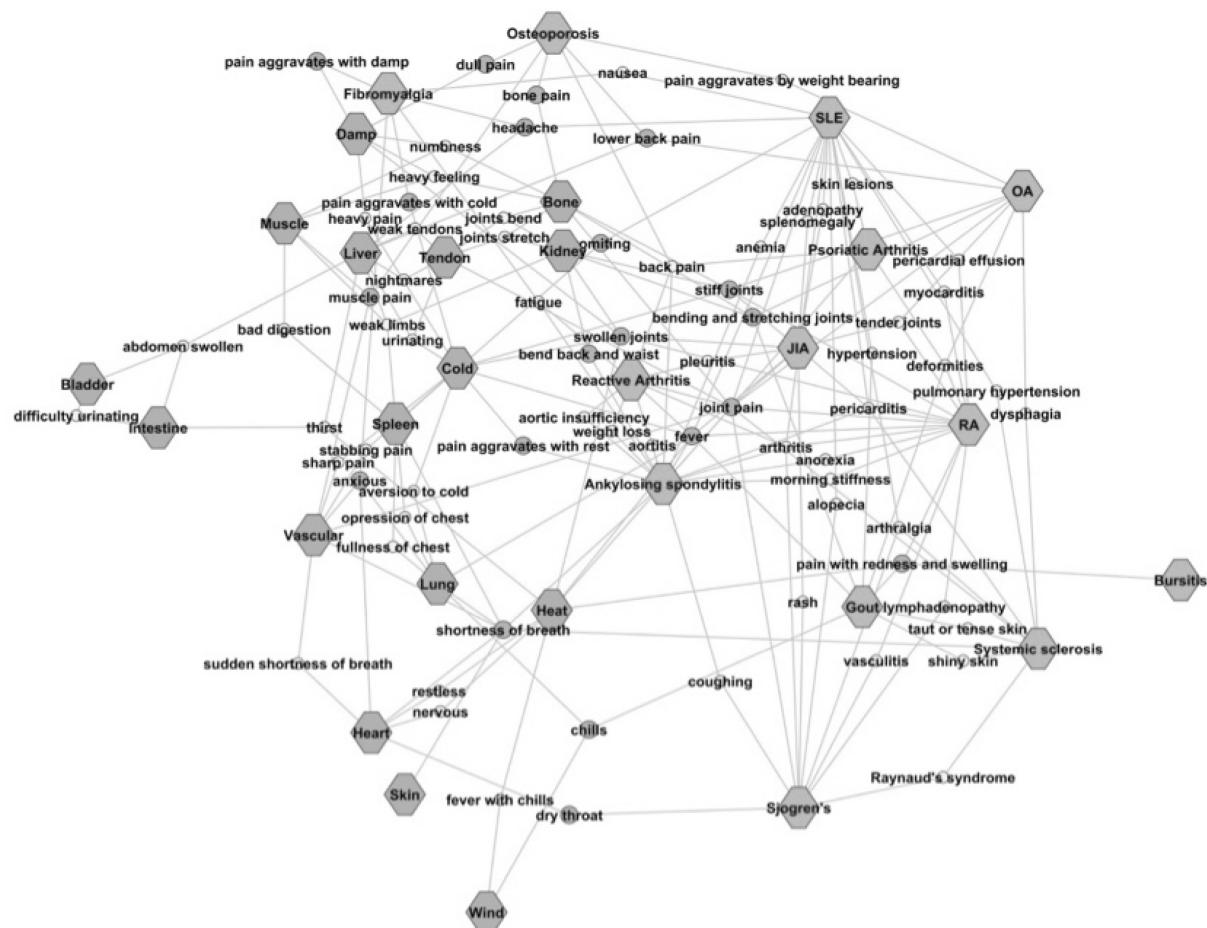


**Figure 11-6: Conceptual Positioning of the Relationships Among Health, Resilience, and Allostasis.**  
Health is challenged by acute stressors and by chronic stressors that could build up allostatic load over time. The response to sudden challenges is often conceptualized as resilience.

## 11.5 SYMPTOMS AS INTERMEDIARIES BETWEEN WESTERN AND ASIAN DIAGNOSES

A Chinese syndrome is characterized by a specific pattern of symptoms, just like a Western disease is characterized by a specific group of symptoms. However, Chinese syndromes and Western disease patterns are determined by different sets of diagnostic tools. Chinese diagnosis makes use of questioning a patient, observing the tongue, and taking the pulse, among other ways of obtaining information about the patient. Western medicine developed many measurement techniques to identify changes in, for instance, blood parameters. A Western disease can consist of many different Chinese syndromes. Conversely, a Chinese syndrome can belong to many different Western diseases. In this way, symptoms can bridge the Western and Chinese diagnoses and help us sub-type Western diseases and find new relationships among the different Western diseases we have not been able to observe yet. Discovering relevant sub-types of diseases, such as Rheumatoid Arthritis (RA) and Diabetes Mellitus Type II is very important for optimizing treatment strategies and moving toward personalized medicine approaches.

Figure 11-7 shows an example of this approach in which RA symptoms were compared to symptoms of Chinese syndromes. In addition, the symptoms of some other rheumatic diseases were also compared to the same Chinese syndromes. This resulted in a network of relationships as shown in Figure 11-7, depicting RA is indeed related to many Chinese syndromes. After checking these observations with Chinese medicine experts, a combination of two general TCM sub-types with RA was chosen for further study, Cold RA and Heat RA. Another argument for this choice was that those two sub-types of patients with RA are treated very differently in Chinese medicine. Therefore, great differences in disease mechanisms can be expected as well as differences in responses to Western medications.

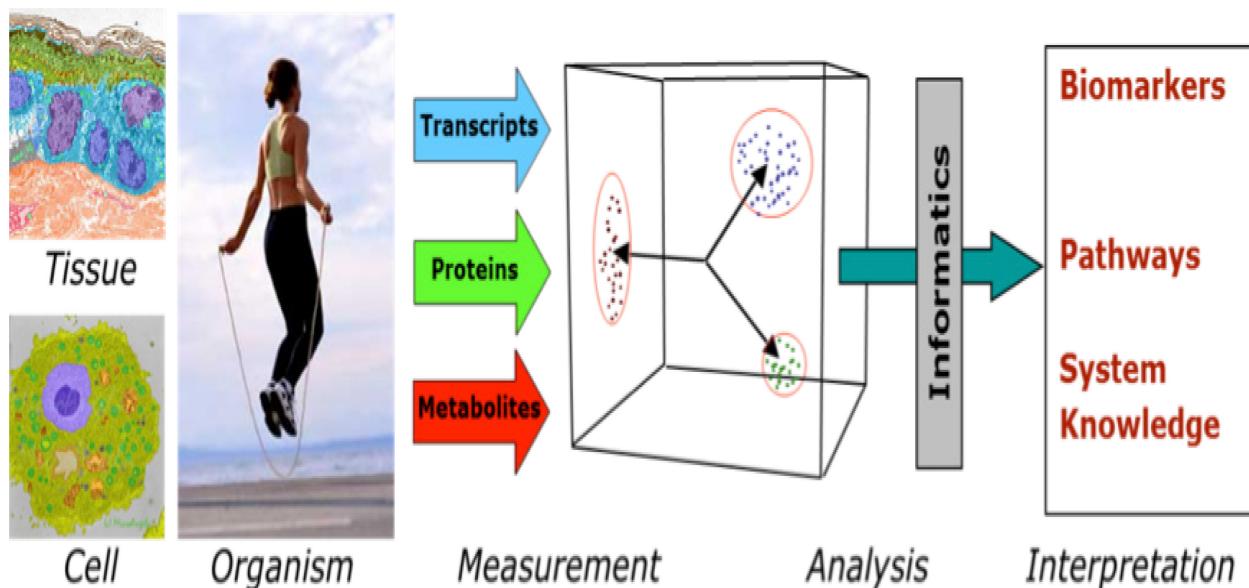


**Figure 11-7: Overlapping Symptom Patterns Between Western Rheumatic Diseases and Chinese Arthritis-Related Syndromes.** The blue hexagons represent the Western disease categories while the orange hexagons represent the Chinese syndromes. The small circles represent symptoms. Only those symptoms are shown that are representative of at least two syndromes, diseases or disease/syndrome combinations (bridge symptoms). SLE (Systemic Lupus Erythematosus); OA (Osteoarthritis); JIA (Juvenile Idiopathic Arthritis); RA (Rheumatoid Arthritis).

## 11.6 METABOLOMICS TECHNOLOGY FOR VALIDATING AND UNDERSTANDING SYMPTOM PATTERNS

An approach was needed to build a bridge between symptom patterns observed and used in Asian medicine and the molecular biologic approach on which Western medicine is founded. The Netherlands Organization for Applied Scientific Research (TNO), Utrechtseweg, Zeist, the Netherlands, together with the Sino Dutch Centre for Preventive and Personalized Medicine, Utrechtseweg, Zeist, The Netherlands, pioneered two research lines in which metabolomics was used to characterize patient sub-types [14]. Western patient classes, RA, and Type 2 diabetes, were sub-typed using Chinese diagnosis. Then blood and urine samples were collected from these patients for metabolomics analysis with the aim of finding biologic molecular mechanisms behind the Chinese sub-types.

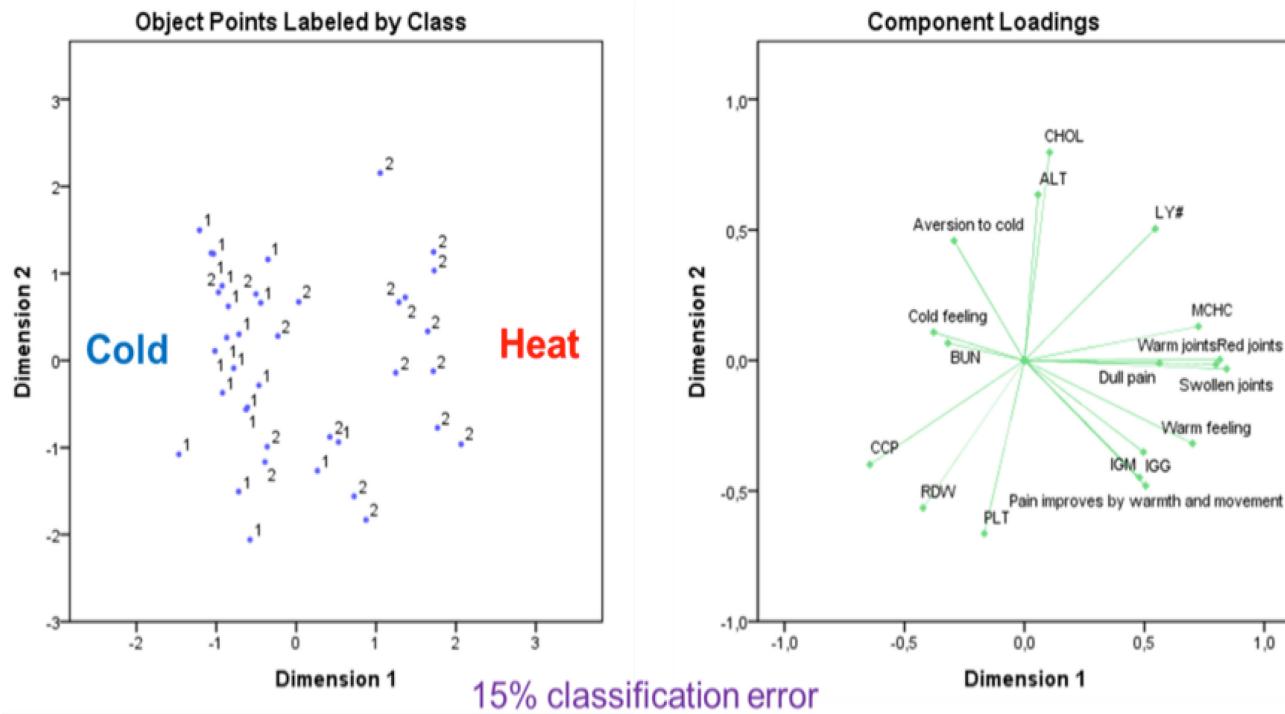
Figure 11-8 summarizes the systems biology approach in which metabolomics is one of the technologies that can be complemented by others, such as proteomics and transcriptomics. Metabolomics focuses on measuring metabolites, which represent the state of the body at a certain moment and can give indications of many processes, such as inflammation, energy balance, oxidative stress, metabolism, hormone organization, etc.



**Figure 11-8: Systems Biology Approach Involves Measuring Large Numbers of Metabolites from Various Tissues and Cells. Next, the approach involves using multi-variate data analysis techniques to determine the most relevant variables, which are subsequently used for interpretation.**

Analysis of the data is a critical step. Various multi-variate data analysis techniques especially suited to working with metabolomics data have been developed over the years. More than a decade ago, non-linear data analyses had begun to evolve in order to supplement the linear ones [9].

Two sub-types of RA, RA Cold and RA Heat, could be classified based on symptom and clinical chemistry profiles with a classification error of 15%. The same patients could also be classified based on urine metabolite profiles with a classification error of 14% [15]. Figure 11-9 shows how the results of a principal component analysis are presented. In the left panel, differences between patients with RA Cold and RA Heat are shown. Both groups are almost separated, but there is some overlap. In the right panel, the symptoms and clinical chemistry measurements that are responsible for most of the variation in the patient groups are shown. The ones pointing toward the left are most related to RA Cold, and those pointing toward the right are most related to RA Heat.



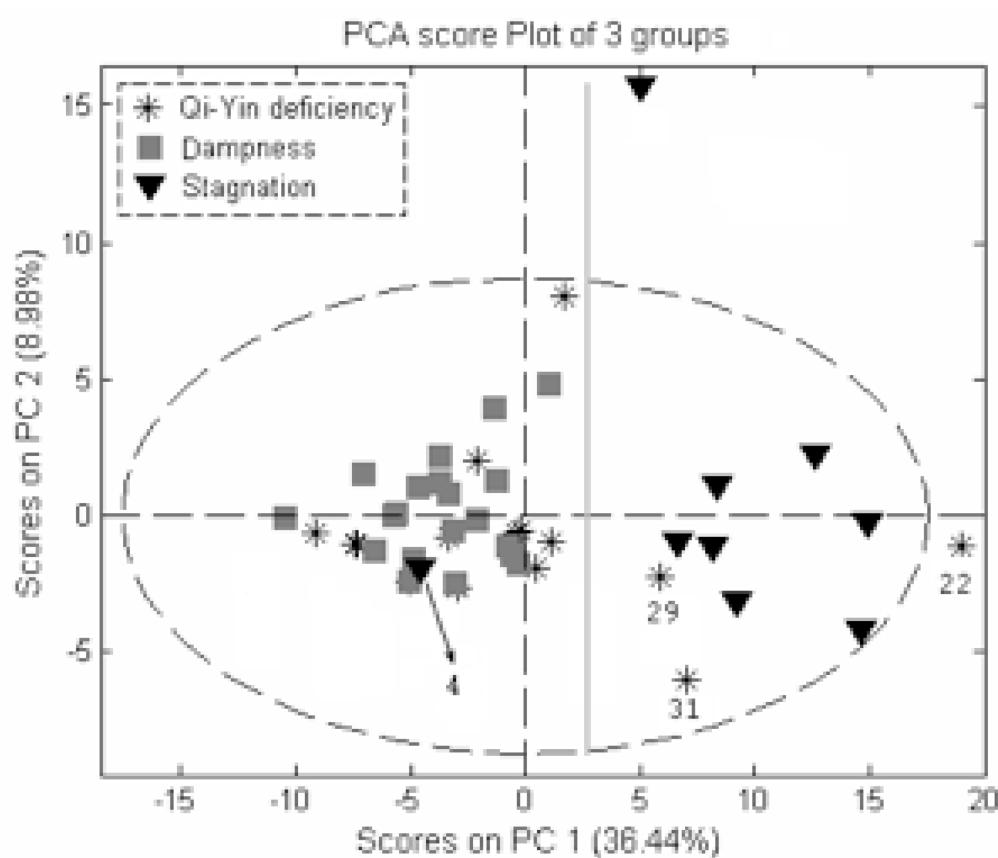
**Figure 11-9: (Left Panel) The Scores of the Patients with Cold and Heat Rheumatoid Arthritis (RA) Obtained by the Optimal Principal Component Analysis Model; (Right Panel) The Loadings of the Variables Used in the PCA Model. The variables pointing toward the right are mostly related to the Heat RA group while the variables pointing toward the left are related to the Cold RA group.**

CHOL (Cholesterol); ALT (Alanine Aminotransferase); LY# (Lymphocyte Number); MCHC (Mean Corpuscular Hemoglobin Concentration); BUN (Blood–Urea–Nitrogen); CCP (Citrullinated Protein Antibodies); RDW (Red blood cell Distribution Width); PLT (Platelet Count); IGM (IgM) (Immunoglobulin M); IGG (IgG) (Immunoglobulin G).

A similar study was performed with patients with prediabetes who were diagnosed by three TCM practitioners in three patient groups:

- 1) Qi and Yin Deficiency;
- 2) Qi and Yin Deficiency with Dampness; and
- 3) Qi and Yin Deficiency with Stagnation.

Metabolomics measurements of urine samples revealed differences in carbohydrate metabolism and renal function between the Stagnation group and the other two groups [16] (Figure 11-10).



**Figure 11-10: Principal Component Analysis Score Plot for Three Groups of Patients with Prediabetes. The Stagnation group is separated from the Dampness group, indicating that different concentrations of urine metabolites have been measured for those sub-groups. PC1 (Principal Component 1).**

Similar to the TCM/systems biology studies on RA Heat and RA Cold, it is possible to define sub-types based on Ayurvedic symptoms, involving Ayurvedic symptom patterns matching with Western rheumatoid arthritis [1].

According to presence or absence of Dampness, the patient will be Kapha- aggravated (excess of Water) or Kapha-lacking. The presence of symptoms of Pitta (inflammation) will make the patient Pitta-positive or Pitta-negative, and dryness will be a sign of Vata aggravation. If sub-groups of patients could be recruited, their specific metabolomic profiles could be measured, conventional treatment plus the specific Ayurvedic corrections could be given, and the evolution of the patients' symptoms could be followed. Many research teams focusing on this field of Ayurgenomics are finding interesting patterns for use in preventive medicine [4]. An example of sub-typing chronic back pain after a Military mission is shown in Figure 11-11.

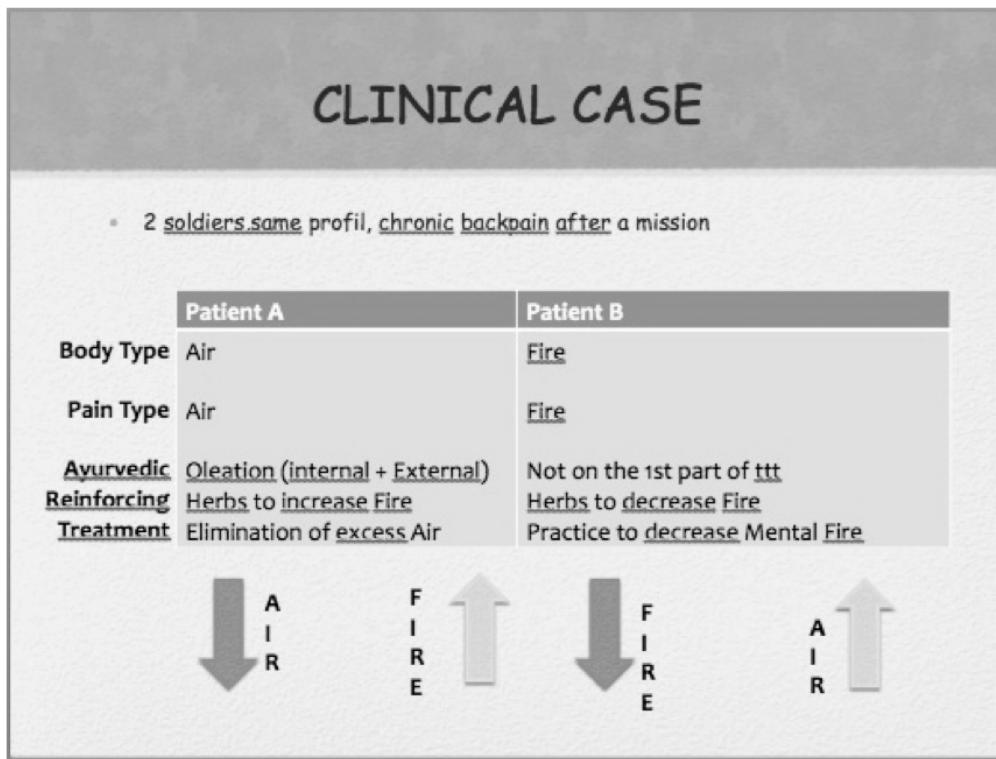


Figure 11-11: A Simplified Clinical Case Including Conventional Western Diagnosis and Ayurvedic Specificities for Chronic Low-Back Pain.

## 11.7 ENDOBIOGENY: A SYSTEMS ENDOCRINOLOGY APPROACH

Another interesting systems biology approach is endobiogeny. The French medical physicians, Jean-Claude Lapraz, MD, and Christian Duraffourd, MD, invented endobiogeny in the early 1970's [8]. Endobiogeny's focus is on the relationships among the different endocrine regulation loops and predicting the stage of an individual (homeostasis, allostasis or disease) according to various indexes reflecting the endocrine functions (Figure 11-12).

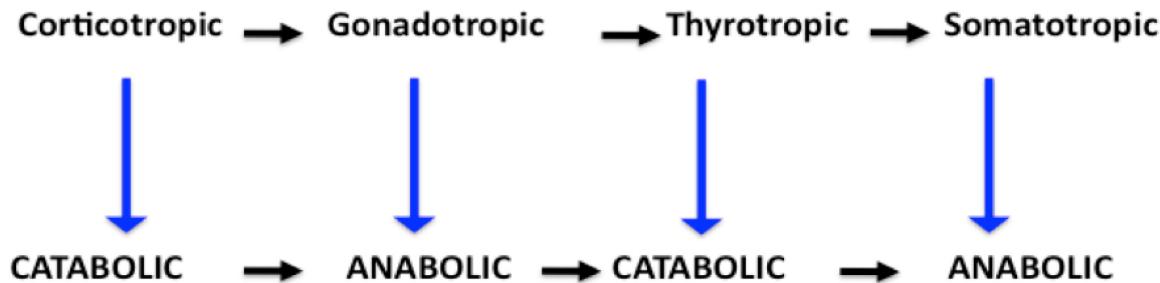


Figure 11-12: Relationships Among the Endocrine Functions. Metabolism begins with catabolism and ends with anabolism. The various axes alternate in their metabolic effects and complement each other by starting or ending the activity of the axis that precedes an axis in a continuous loop of metabolic activity.

Each function is quantified by an *index*, specified by a *level of activity*, and qualified by a *score*. The index expresses the resulting effectiveness of the function's activity, both in itself and in relation to the metabolic needs of the organism. The whole set of indexes gives a very precise longitudinal assessment of an individual body's functionality, system-by-system, organ by organ.

These indexes are calculated mostly from commonly used blood analysis data using formulae that reflect the modalities of functionality. Reliability and reproducibility are provided by a computer-based model that simultaneously determines the whole set of indexes.

This biology of functions allows one to determine the pathogenic tendencies of an organism, its stage of development, and the degree of severity of a potential pathology. Biology of functions can also be used as a tool to track the natural development of the pathology and its development under treatment, in order to adjust the latter better. A flow chart of a study conducted within the French Military is presented in Figure 11-13.

### Application to a afghanistan deployment for screening psychopathology

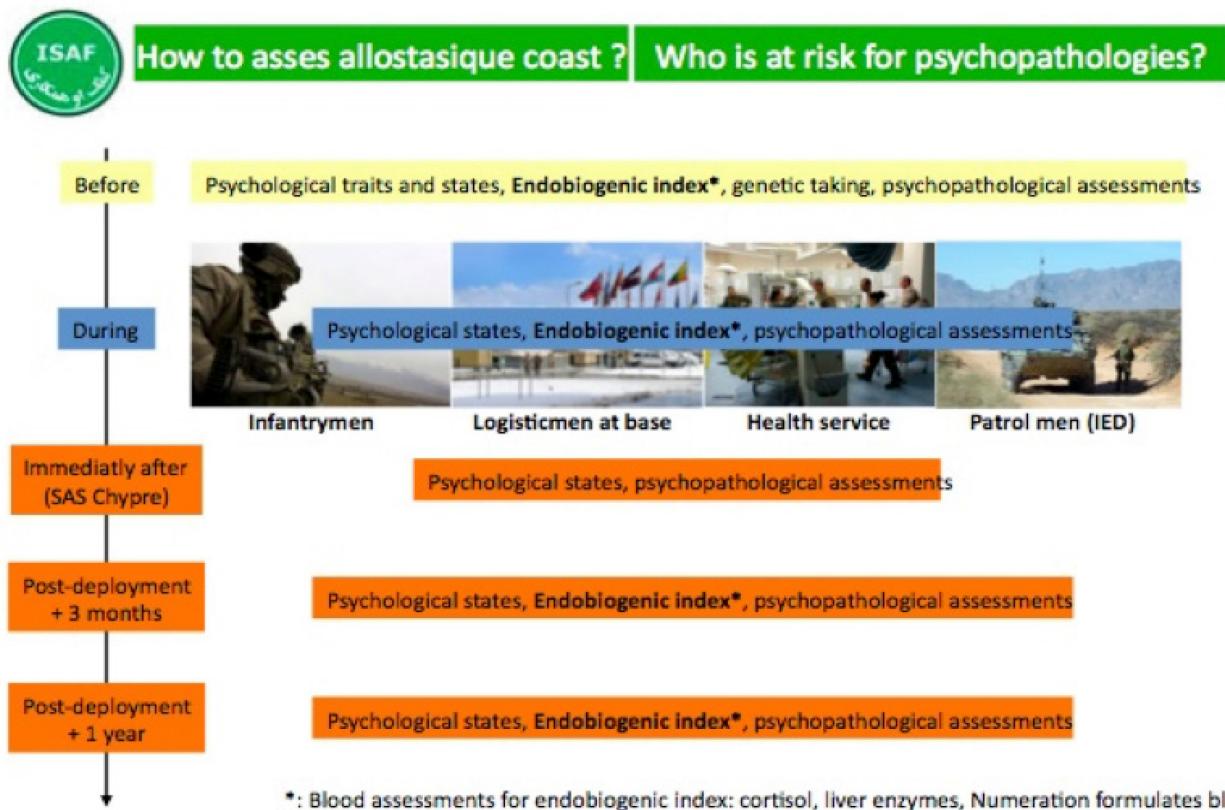


Figure 11-13: Flowchart of an Endobiogeny Study Conducted in the French Military.  
ISAF (International Security Assistance Force); IED (Improvised Explosive Device); SAS (Special Air Service).

## 11.8 MODELING INTEGRATIVE MEDICINE PERSPECTIVES

An essential element for integration of the various types of information obtained from Western scientific approaches and Asian scientific approaches is a method for modeling relationships and dynamics [3]. Mechanistic modeling can be useful in this integration, because mechanistic modeling provides the means to connect both approaches. Suppose we have a model that describes some physiologic variables that are also used for diagnosis in Chinese medicine. Such a model can be extended with a set of variables that describe certain aspects of health from a Chinese perspective, based on a set of equations or rules. Simulations for a number of well-chosen conditions can then be used to display, side by side, the effects of these conditions on Western and Chinese indicators of health. This enables mutual understanding and a common ground for discussions about, and exchanges of, knowledge between Western and Chinese experts.

Recall Figure 11-10 shows an example of how the above can work in practice. TNO developed a first prototype model of a systems health model that describes various aspects of health, including glucose metabolism, mental stress, and inflammation. The inputs of the model are factors related to lifestyle, such as food intake, exercise, and sleep. This model was built in MARVEL, a modeling tool that combines a relatively simple representation of the system of interest [17] with an easy-to-use interface. The interface allows the use of a touch table in interactive discussion sessions with domain experts and stakeholders.

Although a simple representation has some drawbacks, it also has a number of clear advantages: it can intuitively be understood by people who are not familiar with modeling and it allows fast simulation of the effects of changes in input variables, allowing for vivid interaction with experts. Panel A of Figure 11-14 shows the variables and their interactions (the shapes of the arrows in the figure indicate strengths and speeds or interactions). The simulation view in Panel B shows the dynamics of a simulation in which cumulative overfeeding leads to the onset of Type 2 diabetes. The radar chart in Panel C provides an alternative visualization of cause–effect relationships derived from simulation results.

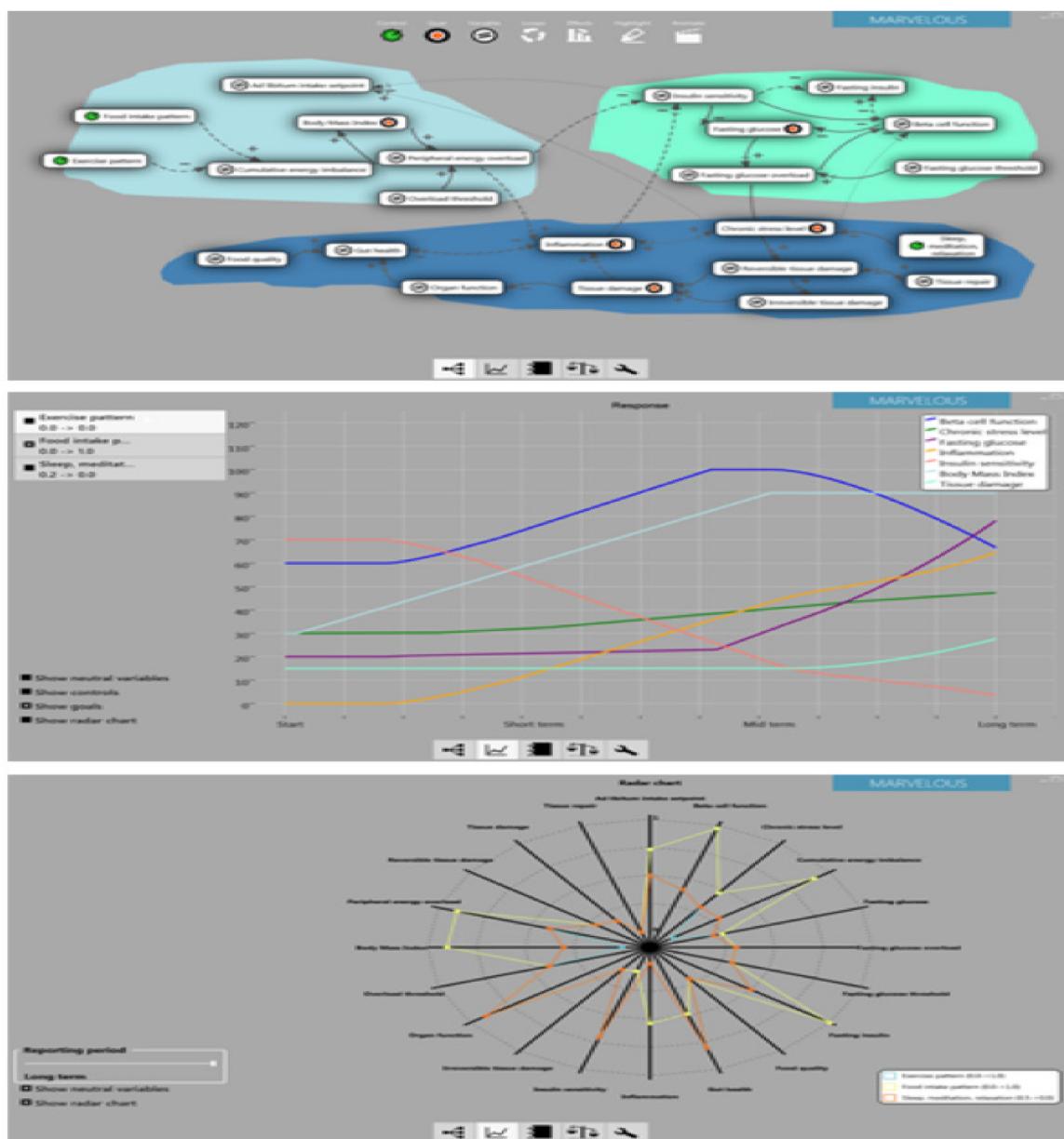


Figure 11-14: (A, B, C) Prototype Systems Health Model Built in MARVEL. Panel A shows the variables and their interactions (shapes of arrows indicate strengths and speeds or interactions).

Panel B shows a simulation of the dynamics in which cumulative overfeeding leads to the onset of Diabetes Mellitus Type II. The radar chart in Panel C provides an alternative visualization of cause–effect relationships derived from simulation results.

## 11.9 CONCLUSIONS

This new comprehensive approach, bridging the East and the West, creates novel opportunities for Military health care systems. More targeted and personalized treatment options can be developed for Soldiers, as well as novel health-promotion strategies based on foods, herbs, acupuncture, and other modalities.

## 11.10 RECOMMENDATIONS

Asian science and medicine is essential for the future of health care. There is a clear need to bridge the chasm between psychology and biology, which appears to be marginally successful in current scientific approaches. Asian medicine can provide an integrative perspective on many diseases, allowing opportunities for better treatment and more personalized treatment.

Two essential focus points can be identified to move the field forward from a scientific point of view. First, techniques should be developed further to obtain Asian symptom patterns from patients in an objective manner. This involves a shift from developing questionnaires, which are linear in nature, toward developing expert systems. Expert systems are ideally suited to address the non-linear nature of gathering patient information and discovering underlying disease patterns. Such expert systems can be installed easily on mobile devices for use in the field.

Second, approaches should be developed to integrate the variety of types of data using state-of-the-art dynamic mechanistic modeling techniques. Effort needs to be made to develop such models with currently available knowledge in the literature and from experts.

Both of the above elements are relevant in a Military setting. The expert systems based on Asian dynamic symptom patterns provide a unique diagnostic system for tracking aspects of resilience, fitness and health. The dynamic models can also be installed on mobile devices, enabling tracking of many sources of data, such as food intake, activity patterns, physiologic measures, mood, etc. The model can then be used to simulate the effects of possible interventions on the performance of an individual. Such models can therefore be used by an individual but also by commanders for monitoring unit resilience. At many levels of a Military organization, these tools can provide hypotheses for interventions, directions for spending research money, tracking resilience and health, and empowerment for individuals.

## 11.11 REFERENCES

- [1] Chopra, A., Lavin, P., Patwardhan, B. and Chitre, D. A 32-week randomized placebo-controlled clinical evaluation of RA-11, an Ayurvedic drug, on osteoarthritis of the knees. *J Clin Rheumatol.* 2004;10(5):236-245.
- [2] Dallmann, R., Viola, A.U., Tarokh, L., Cajochen, C. and Brown, S.A. The human circadian metabolome. *Proc Natl Acad Sci U S A.* 2012;109(7):2625-2629.
- [3] De Graaf, A.A., Freidig, A.P., De Roos, B., et al. Nutritional systems biology modeling: From molecular mechanisms to physiology. *PLoS Comput Biol.* 2009;5(11):e1000554.
- [4] Dey, S. and Phawa, P. Prakriti and its associations with metabolism, chronic diseases, and genotypes: Possibilities of new born screening and a lifetime of personalized prevention. *J Ayurveda Integr Med.* 2014;5(1):15-24.
- [5] Garodia, P., Ichikawa, H., Malani, N., Sethi, G. and Aggarwal, B.B. From ancient medicine to modern medicine: Ayurvedic concepts of health and their role in inflammation and cancer. *J Soc Integr Oncol.* 2007;5(1):25-37.
- [6] Glass, L. Synchronization and rhythmic processes in physiology. *Nature.* 2001;410(6825):277-284.

- [7] Huber, M., Knottnerus, J.A., Green, L., et al. How should we define health? *BMJ*. 2011;343:d4163-d4163.
- [8] Lapraz, J.C. and Hedayat, K.M. Endobiogeny: A global approach to systems biology (part 1 of 2). *Glob Adv Health Med*. 2013;2(1):64-78.
- [9] Meulman, J.J., van der Kooij, A.J. and Heiser, W.J. Principal components analysis with nonlinear optimal scaling transformations for ordinal and nominal data. In: D.W. Kaplan, ed. *The SAGE Handbook of Quantitative Methodology for the Social Sciences*. Thousand Oaks, CA, USA. Sage Publications; 2004:49-70.
- [10] Oltvai, Z.N. and Barabási, A.L. Systems biology. Life's Complexity pyramid. *Science*. 2002; 298(5594):763-764.
- [11] Valiathan, M.S. *The Legacy of Caraka*. Himayatnagar, Hyderabad, India: Orient Blackswan Private; 2003.
- [12] van der Greef, J. Perspective: All systems go. *Nature* 2011;480(7378):S87-S87.
- [13] van der Greef, J., van Wietmarschen, H., Schroën, J., Wang, M., Hankemeier, T. and Xu, G. Systems biology-based diagnostic principles as pillars of the bridge between Chinese and Western medicine. *Planta Med*. 2010 Dec;76(17):2036-47. doi: 10.1055/s-0030-1250450. Review.
- [14] van der Greef, J., van Wietmarschen, H., van Ommen, B. and Verheij, E. Looking back into the future: 30 years of metabolomics at TNO. *Mass Spectrom Rev*. 2013;32(5):399-415.
- [15] van Wietmarschen, H., Yuan, K., Lu, C., et al. Systems biology guided by Chinese medicine reveals new markers for sub-typing rheumatoid arthritis patients. *J Clin Rheumatol*. 2009;15(7):330-337.
- [16] Wei, H., Pasman, W., Rubingh, C., et al. Urine metabolomics combined with the personalized diagnosis guided by Chinese medicine reveals subtypes of pre-diabetes. *Mol Biosyst*. 2012;8(5):1482-1491.
- [17] Zijderveld, E. MARVEL – Principles of a Method for Semi-Qualitative System Behaviour and Policy Analysis [presentation]. System Dynamics Society Conference. Boston; (2007:1-21). [Internet]. <http://systemdynamics.org/conferences/2007/proceed/papers/VAN%20Z213.pdf>, Accessed September 14, 2015.

## Chapter 12 – CURRENT AND FUTURE DIRECTIONS FOR INTEGRATIVE HEALTH AND HEALING: A SUMMARY OF THE NATO HFM TASK FORCE

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### ABSTRACT

*Simply put, medicine is culturally based and alternative medicine is a polarizing field. However, because healthcare delivery systems must constantly change to meet societal healthcare needs, consideration of different cultures and perspectives must occur to develop new paradigms in healthcare delivery. Integrative Health and Healing (IH2) offers a model of holistic care that has the potential for substantial benefit for Military organizations. This article is a summary of the results and recommendations of the NATO Task Force HFM-195, Integrative Medicine Interventions for Military Personnel. Next steps and quick wins with the implementation of meditative and acupuncture techniques are discussed. The NATO Task Force HFM-195 was formed to evaluate the current status of complementary and integrative medicine within the Military units of the NATO participating countries. The Task Force recommends that IH2 offers a new perspective on healthcare delivery in Military organizations. Specifically, this includes implementation of selected IH2 practices; development of educational programs for patients, providers, and policy-makers; and review of clinical outcomes and best practices. Collaborative research partnerships need further exploration.*

*Keywords: Complementary and Alternative Medicine, Integrative Health and Healing, Integrative Medicine, NATO, Task Force.*

## 12.1 INTRODUCTION

*It is more important to know what sort of person has a disease than to know what sort of disease a person has.” [2] Hippocrates*

Simply put, medicine is culturally based and alternative medicine is a polarizing field. However, because healthcare delivery systems must constantly change to meet societal healthcare needs, consideration of different cultures and perspectives must occur to develop new paradigms in healthcare delivery. Therefore, over the past five decades, a new paradigm, called alternative medicine, has been emerging. Like healthcare, alternative medicine has “matured” as the knowledge of the related practices and science becomes better understood. Thus, the nomenclature has changed to reflect the evolutionary process: from alternative to complementary to integrative medicine to integrative health and healing, with the latter term as suggested in this report. The polarization is therefore reduced somewhat.

Effecting changes to long-standing cultures is difficult. It is even more difficult to change Military medicine because it abuts two cultures: that of medicine and that of the Military. Integrative Health and Healing (IH2) offers a model of holistic care that has potential for significant benefits for Military organizations, a model that embraces the cultures of medicine and Military.

Improvements to the world’s healthcare systems will benefit both the individual and the collective whole. Collaborative teams must develop a pluralistic healthcare system of understanding, listening, guidance, and respect. Cultural fluency has been defined as “having the capacity to embrace and flow within many various cultural environments, and the ability to utilize diversity for understanding and growth.” [8] Thus, cultural fluency can be used to guide the establishment of a new Military model of health and healing through the expansion of viewpoints. This will only lead to improved outcomes.

Multi-national organizations such as NATO are the best place to begin these partnerships. The new healthcare paradigm should be void of hierarchical structures with the understanding that there is no single correct system. The paradigm incorporates treatments plans designed for individuals. A treatment program that best suits and treats the patient is the correct one. This is achieved only when all options are considered. The countries within the NATO framework offer differing cultural perspectives, experiences, and philosophies that collectively will benefit all organizations. Therefore, the NATO Task Force is the first step to opening this door to improved global Military health and healing.

## 12.2 CULTURAL CONCEPT OF HEALTHCARE SYSTEMS: THE NEED TO UNDERSTAND AND EMBRACE

The culture of a society is embedded within the healthcare systems of that society. This has been true since ancient times. As a result of globalization of the world, the differences in cultures and healthcare systems become more apparent. Adding to the complexity, healthcare systems used to treat Military members must adapt to the Military culture to be effective within the Military framework. Leveraging the NATO Military perspectives of differing healthcare systems will lead to improvements for all systems.

Table 12-1 compares the cultural aspects of global healthcare systems, specifically from the “Western” and “Eastern” points of view. Although tables give visible structure to a discussion, there are limitations. A two-column table would be oversimplified. It would fail to illustrate that differing healthcare systems are not represented as an either/or choice, but rather that systems should flow from one to another. Thus, a third column

has been added. This center column represents this flow from one system to another; however, the descriptors need to be developed as the new paradigm of healthcare emerges.

Table 12-1: Cultural Aspects of Global Healthcare Systems.

Descriptive Term	Biomedical Construct	Balance Between the Two Systems	Relational Construct
Terms *	Allopathic, Western, standardized, scientific, modern, conventional, ontological, materialistic		Eastern, alternative, complementary, integrative, traditional, holistic, non-materialistic, homeodynamic
Described in Terms of	Nouns, states of being		Verbs, dynamism and balance
Embedded Theories †	Reductionist, Categorical, Newtonian physics, Cartesian, mind/body dualism, rationalized		Holistic, quantum physics, non-scientific, patient-centered, relational
View of Body ‡	Mechanical, machine, “body”		Psychosocial, energetic process, spiritual, “mind”, person, body-person
Examples §	“Western” specialties and sub-specialties, e.g., cardiology, internal medicine, orthopedics		Curanderismo, TCM, Ayurveda, psychiatry, Shamanism
Focus	Objective, measureable phenomena and technology to achieve a diagnosis, abnormality based on “standardized ranges”, organ/system centered		Individuality and why <i>this</i> person has <i>this</i> condition at <i>this</i> time
Treatment Focus	Distinct disease entity (symptom-related illness)		Restoration of balance (energetic flow and homeodynamic)
Body Focus	Physical body (organ, tissue, cellular level)		Energetic (vital spirit, qi, ch'i, ki, prana), psychosocial, social bodies
Model of Disorder (Primarily)	External (pathogens, environmental impact on individual)		Internal energetic imbalances, dysfunction (disruptive flow and homeodynamics) leading to somatic disease
Underlying Issues for Seeking Treatment	Disease, pathogenic origin with distinctive symptoms/ signs, single causes, specific treatments		Deep rooted causation, multiple level energetic imbalances
Entry Point	Trauma, acute illness, end-stage physical malfunction, minimal preventive care		Pre-somatic/physical manifestation of energetic dysfunction/imbalance, wellness, preventive care
Variability of Disorder	All individuals react in the same way to the same pathogen (e.g., diabetes is diabetes in all individuals with the disease)		Each individual reacts differently from others and temporally with self
Individual Locus of Control	Passive		Active, responsible

Descriptive Term	Biomedical Construct	Balance Between the Two Systems	Relational Construct
<b>Treatment</b>	Diseased-based (e.g., HTN requires anti-hypertensive medication)		Individualistic (individual's energy/constitution lead to the imbalance), Law of Cure II **
<b>Death</b>	Failure of treatment		Natural outcome for some
<b>Provider Participation</b>	Authoritative		Facilitator
<b>Therapeutic Goal</b>	Cure, recent emphasis on management of disease		Healing, wellness, quality of life
<b>Education of Practitioner <sup>#</sup></b>	Formal education with examination at discrete steps, legal criteria for practice		Apprenticeship with evaluation of quality of care determined by preceptor and community Formal education with examination at discrete steps, legal criteria for practice
<b>Research Model &amp;</b>	Randomized, placebo controlled double blinded trial, "evidence-based"		Model validity, whole systems research, mixed methods research, "evidence-based"
<b>Practice Type</b>	One practitioner-one patient at a time, community-based, hospital, home care		One practitioner / one patient at a time, community-based, hospital, home care
<b>Challenges</b>	Chronic illness, degenerative conditions, stress-related disorders, technology-based, tends to be high cost		Acceptance by dominant Allopathic systems, minimally evidence-based, based on biomedical perspectives
<b>Ultimate Goal</b>	Care of the patient	Care of the patient	Care of the patient

**Legend**

\* Defining medical systems is nearly impossible, especially confining the definitions to a bimodal pattern. The terms used are those found in the literature, related to each of the main categories. Every term has potential critiques and challenges. Many could be used in both columns. As an example, using the term "standardized" for biomedicine is more of an attempt to place biomedicine in a position over other forms of medical care. This is not the reality. Additionally, "standardized medicine" has not been proven to be "good" or "safe" in all cases. The incidences of iatrogenic harm from standardized treatments confirm this. As a result, numerous organizations have evaluated "standardized practices" and recommended steps to improve safety and effectiveness. Further, no individual treatment is truly holistic. When relational treatments are used in isolation, the paradigm of holistic care is missed. This is a significant potential pitfall for the relational treatments; i.e., using a relational treatment can lead to the misunderstanding that one is treating in a holistic approach, just because the treatment term is from the right-sided column.

\*\* Constantine Hering described healing in terms of the concept known as the law of cures. Although Dr Hering was a homeopath, the law of cures can be applied to any system. Specifically, healing occurs:

- 1) Symptoms heal from the deepest (most limiting) level to the most superficial. This means often from the mental into the emotional and finally into the physical, although it can also be simultaneous on two or more levels.
- 2) Symptoms resolve in the reverse order that they came: the most recent going away first.
- 3) Symptoms should improve from above downwards.
- 4) Symptoms heal from the most important organ to the least important organ (i.e., generally from the heart to the skin which is the most superficial organ).
- 5) Symptoms improve from the center of the body to the periphery (hands and feet).

† Scientific endeavor is deeply embedded in the "randomized control trial" approach of research to describe acceptable practice. However, observations, experience, analytic and clinical assessments nonetheless add valuable information. At times, it is the only means to gain insight. The medical field continues to support RCT to define effectiveness, safety and acceptability of a modality. However, RCT cannot adequately view many of the relational modalities. It just doesn't fit. All represent science. Therefore, neither side of the table is truly "non-scientific" despite the appearance the table gives.

- ‡ With time, the biomedical construct has been forced to understand that the body without the mind is an inadequate view of the paradigm. Viewing outcomes in a singular term did not lead to an understanding in how the effect was achieved. Therefore, a broader view of the “body” and “something else” was developed. This includes concepts of “placebo” and “suggestion” to help define the construct. In the relational construct, the emphasis has been on the response of the “whole”. That is to say a medication used to treat hypertension, which works on the cardiovascular system (biomedical thinking) has an effect on the entire person as well as the supportive community of the individual. A way to understand this is to understand that a person with well-controlled hypertension may bring happiness to their family and friends because they can now participate in shared-interest activities. The relational model recognizes that both interactions and interventions impact the patient; biomedicine minimizes interactions and emphasizes interventions.
- § Biomedicine reduces itself into specialties, such as cardiology, orthopedics. Each, in isolation is not a fully formed medical system. This is the hallmark of reductionism. Relational modalities can have sub-specialization as well. However, many of terms in the right side column represent “world medical systems”. Some of these systems are whole medical care practices. Thus it is difficult for a comparison of the two models. Those involved in the biomedical construct put “all other systems that are not biomedical” in the relational construct. This is the fallacy that just because something does not fit it one category, it automatically fits into the other and subsequently there is an appropriate direct comparison.
- # The use of the apprenticeship approach can be locale and medicine specific. However, this approach is becoming rare for any system training. In fact, internships and residencies (biomedical construct) are, in the true definition, types of apprenticeships (system of training a new generation of practitioners of a trade with on the job training and accompanying studies).
- & The term “evidence-based” applies to both constructs, although the perspective of what is evidence-based may be different from the point of view of one onto the other.

Thus, the table reinforces the concept that healthcare systems are complex and require multi-dimensional views and explanations. There are hundreds of treatments, systems, approaches, and sub-specialties. Many of these are culturally based. Some are full medical treatment systems. Others are simple techniques that can be used in specific situations. The list of “what is what” can go on and on. Certainly, many systems cannot be honestly and adequately compared to others because labeling is artificial, grouping is artificial, and comparisons are artificial. Often, attempts to label, group, and compare reveal biases, prejudices, ignorance, and misunderstandings. However, attempts to identify new means of delivering health and healing must be undertaken. Simply stated, improvements to all systems are needed. Over the past few decades, there have been meaningful strides and efforts toward this. The NATO Task Force on Integrative Medicine is evidence of this. As the system is evaluated and critiqued, flexibility in understanding and acceptance of difference is an upmost necessity. Table 12-1 is a first step to provoke intellectual and emotional discussions. The hope is that as a result, there will be an understanding of each system’s value and a cooperative willingness to consider change. Ultimately, patients will benefit from the larger available “toolbox” of treatment options to meet their needs and goals of health and healing.

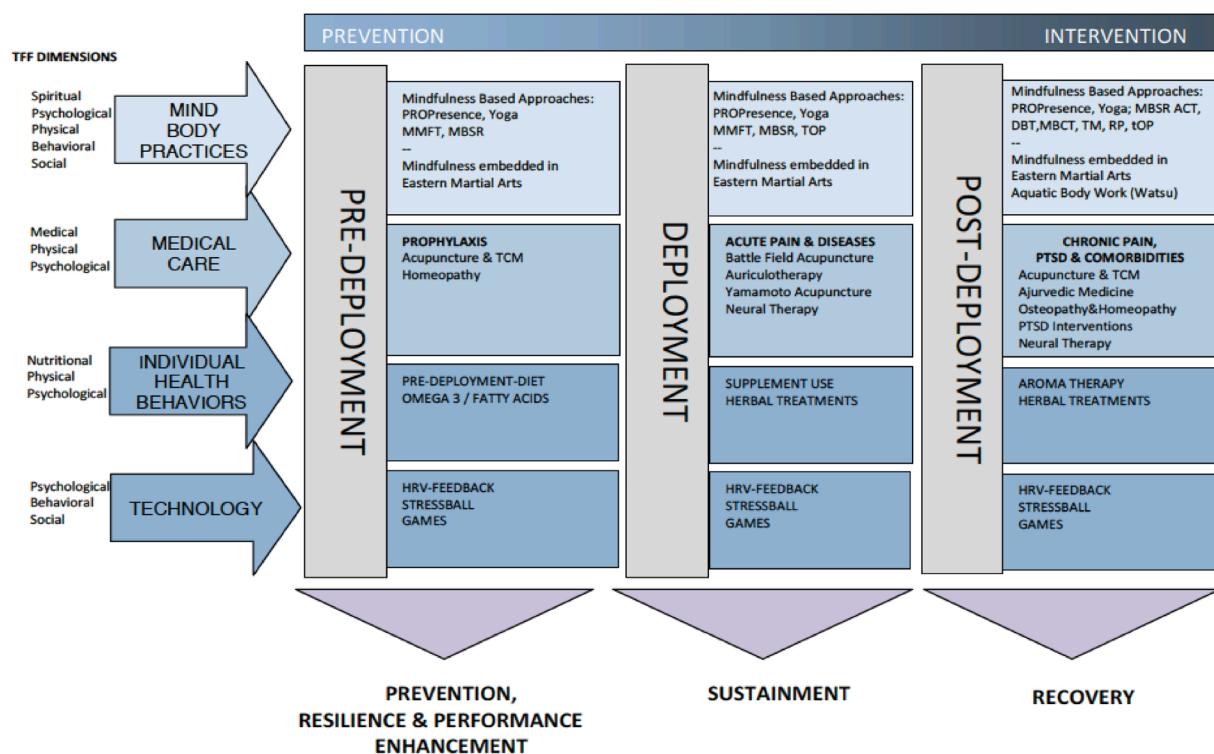
### 12.3 INTEGRATIVE HEALTH AND HEALING PRACTICES

A clinic or center that provides just acupuncture, meditation, yoga, and other such integrative medicine modalities is an integrative center in name only. Numerous hospitals, centers, clinics, and healthcare systems that have incorporated integrative medicine into practice have failed for various reasons: the lack of political and financial support, challenges with credentialing and privileging status, standards with educational requirements, sparse evidence-based science, and a system of fragmented care [4], [5]. These barriers must be overcome with continued well-designed research and policies that result in improved political and financial support and acceptance. However, the manner in which a treatment is provided is the crucial challenge to developing a truly IH2 practice. Therefore, fragmentation of care must be addressed and resolved. As Rakel and Weil write, “Simply adding CAM therapies without changing our healthcare model is like increasing the number of specialists with no primary care infrastructure, an approach that increases cost and reduces the quality of care.” [7]

IH2 practices must provide the “milieu of care” that embraces the true integrative philosophy and concepts of participation, responsibility, and empowerment. This applies not just to the integrative modalities. It also applies to the entire treatment plan, whether that includes acupuncture, medications, or surgery. The whole system must be set up so that the patient “flows” within the system of well-coordinated healthcare instead of our current disjointed system of appointments across several specialties. Modalities need to complement each other instead

of “competing” with offsetting side effects and results. Individuals need to be empowered to be truly active and not passive. IH2 practices can leverage the philosophy of developing health behaviors by promoting individuals’ resources that improve understanding of health and personal development. The participant as well as the system itself must be empowered to provide the best care for the optimal outcomes.

Cure is not the determinant of success; rather, an improved quality of life, which supports the process of healing, is the measure of success. Curing is often misinterpreted as healing. This is not to say that curing cannot be healing; however, curing is often perceived to have removed the origin of the disease when in fact it often only removes the obvious symptoms of the illness. Healing occurs when the patient begins to be aware of the causal factors that led to the disease processes (i.e., the root causes). In the current “Western” paradigm, we excel at symptom management instead of assisting with awareness of cause. We must now begin to excel at health and healing and align our strategic and operational actions to the holistic perspective that underlies a healthcare system based on IH2. Figure 12-1 shows a NATO Task Force–proposed matrix illustrating the use of integrative medicine modalities for Service Members from prevention to intervention.



**Figure 12-1: Proposed Matrix for Integrative Medicine Treatments. HRV (Heart Rate Variability); MMFT (Mind Fitness Training Institute); MBSR (Mindfulness-Based Stress Reduction); MBSR ACT (MBSR with Acceptance and Commitment Therapy); PTSD (Post-Traumatic Stress Disorder); RP (Relapse Prevention); TCM (Traditional Chinese Medicine); TFF (Total Force Fitness); TOP (Tactics to Optimize the Potential); TM (Transcendental Meditation).**

Throughout the NATO medical systems and communities, new methods of practice are being used and evaluated. Examples of this include the U.S. Department of the Army’s Interdisciplinary Pain Management Centers, which are devoted to a holistic approach to pain [6]. The French Military Fire Fighters are using stress management programs based on cognitive and emotional interventions for stress perception and reactivity

(see Chapter 9 of this report titled “*Tactics to Optimize the Potential (TOP) and CardioBioFeedback (CBF) in Stress Management: The French Experience*”, pages 9-1 through 9-14, for details). The use of mindfulness practices (see Chapter 7 of this report titled “*Mindfulness-Based Practices as a Resource for Health and Well-Being*”, pages 7-1 through 7-17, for details) and the concept of spirituality/religiosity [3] for health, well-being, and adaptive coping resources are under evaluation within the German Military. Finally, battlefield acupuncture and auricular trauma protocol are used by several militaries for the treatment of pain and early manifestations of post-traumatic stress, especially following an exposure to a major trauma or disaster [1].

Some collaborative projects resulting from the NATO meetings include:

- 1) A French/German collaboration to explore relationships between mindfulness and life satisfaction and stress levels;
- 2) The evaluation of the cultural differences in rates of post-traumatic stress disorder based on psychological factors in the International Security Assistance Force troops; and
- 3) A French/German collaboration on the beneficial resources and unmet psychosocial and spiritual needs of Military personnel.

## 12.4 DISCUSSION

The overreaching construct of a paradigm of IH2 cannot be developed within the confines of a single Task Force Group. The basic goal of the Task Force was to review the current state of CIM or IH2 within the global healthcare system, particularly that of the NATO participant countries.

### 12.4.1 An Exploratory Task Force

This Task Force, HFM-195, Integrative Medicine Interventions for Military Personnel, was primarily of an exploratory nature. World healthcare systems, such as Traditional Chinese Medicine, Ayurveda, and Tibetan medicine, were explored as potential models of new perspectives on healthcare delivery. Modalities such as mindfulness, meditation, acupuncture, spirituality, religiosity, mascots, protective environments, nutrition/supplementation, and yoga were discussed with particular emphasis on the use within Military healthcare systems. Paradigm shifts using systems approaches and the concept of personalized medicine for resiliency, trauma spectrum disorder, pain, and stress disorders were introduced as a system of health and healing instead of the current system of disease management.

Common themes emerged from the NATO Task Force HFM-195. First, the use of IH2 modalities is common, although statistics showed significant variations. Second, the most challenging barrier for IH2 is the lack of standard, accepted terminology. This lack of uniformity affects communications, collaborations (clinical, research, education), regulatory policy development, reimbursements, acceptance, and comparative evaluations. This is a much-needed first step. Third, the increasing popularity of integrative medicine modalities has been due to consumer demand. Policy-makers need to recognize the rationale for the dissatisfaction with the current healthcare system. Open-minded discussions with all stakeholders will only result in improved systems of healing. Fourth, several modalities can be implemented into the Military systems, with evidence that the treatments are safe, cost-effective, and efficacious for the Military population. These include:

- Acupuncture, particularly battlefield acupuncture;
- Mindfulness/meditation; and
- Movement/yoga.

At the same time, international regulations, credentialing policies, education requirements, treatment protocols, tiered provider-level approaches, and research opportunities relevant to NATO, as well as appropriate recommendations, must be thoroughly reviewed for these modalities. Fifth, financial consideration of healthcare is paramount given the ever-decreasing Military and national budgets. IH2 modalities offer high-touch, low-cost, safe, and effective treatment options. Therefore, the financial burden that medical healthcare imposes on budgets and the potential effect of IH2 on those budgets needs to be evaluated.

Finally, pain and stress-related conditions are high-value targets for implementation of IH2 modalities. These conditions affect a substantial portion of the Military personnel and place a large financial burden on the overall system. Therefore, specific programs for the treatment of pain and stress-related conditions need to be implemented and monitored.

#### **12.4.2 The Need for Collaborations**

As new practices are refined and researched, new policies, standards, and guidelines will be established. Currently, envelopes are being pushed. Limits are being stretched. And the status quo is being challenged. The pushing, the stretching, and the challenging must continue if the current medical systems will have any success with sustainability or if the patient's health is to be improved. However, few international, collaborative efforts are being made to define terminology, leverage best practices, maximize the coordination of efforts, develop research partnerships, or adopt strategic policies. Such partnerships would improve global health. International collaborations need to occur.

### **12.5 RECOMMENDATIONS**

The NATO Task Force HFM-195 made recommendations based on the broad categories of clinical, educational, and research aspects.

#### **12.5.1 Clinical Aspects**

Implement multi-national programs of those modalities with minimal side effects and potential benefit to the individual and Military organizations, such as yoga, mindfulness, movement, biofeedback, and battlefield acupuncture. Concurrently, an international core of professionals or subject-matter experts should be developed. Once established, "train the trainer" programs should be taught to minimize expenditures and maximize resources of local experts. Battlefield acupuncture and mindfulness programs could easily be implemented quickly and widely in the proposed manner. Throughout, the monitoring of best practices and outcomes, with recommendations and modifications as indicated, is necessary.

#### **12.5.2 Educational Aspects**

Handbooks, guides, and pamphlets for Service Members, practitioners, and leadership should be written. Examples could be "A Service Member's Guide to Meditation Techniques" or "Vital Information a Commander Needs to Know About Integrative Health and Healing". These instructional aids would educate patients on modality use and proper techniques, explore the various perceptions regarding IH2, or explain the importance of a shift in practice. Further, information and education on the importance of Military culture and its uniqueness could be addressed so modalities could be adapted for optimal acceptance and utilization within a Military framework.

### **12.5.3 Research Aspects**

International collaborations in multiple areas of research are necessary. Multi-center and multi-cultural studies would yield valuable information not obtainable from a single-center study. Potential areas of research include the financial benefits of IH2 inclusion in the current healthcare systems, comparative cost-effectiveness of various modalities and for various conditions, and effect and benefits of IH2 on the collective (such as Military unit cohesion, readiness, resiliency, and overall unit performance) as well as individual (such as an improved sense of well-being and quality of life and the social impact for the individual). Collaborations with other NATO task forces, hospitals/healthcare centers, academia, and international organizations should be sought out.

## **12.6 REMAINING QUESTIONS**

In the final analysis, the Task Force had more questions than answers. This suggests that further investigations with additional task forces, symposia, or conferences are indicated. The following is a list of some of the questions raised by the Task Force.

- 1) What is acceptable terminology of IH2 and related practices?
- 2) How can international cultural and perspective differences be used to develop improved global healthcare?
- 3) How is IH2 accessed in and out of the Military healthcare systems?
- 4) What are the costs to implement IH2 practices?
- 5) How will IH2 affect the organization and the individual?
- 6) Can other partners fund the implementation? International versus national?
- 7) What is the broader economical context to family and society? Can this be used to leverage civilian partnerships?
- 8) How should the continuity of care from Active Duty to veteran be managed to include partnerships between Military and civilian agencies?
- 9) Can the integrative medicine modalities be translated into an active exercise (i.e., passive versus active participation)?
- 10) How can IH2 be used in developing the “new normal” for injured Service Members?
- 11) How can bias be minimized to allow for the best practices to be implemented both at individual and policy levels?
- 12) How can IH2 fit into the current healthcare systems as complementary (e.g., pharmacologic interventions or surgical procedures)?
- 13) Can IH2 alter addiction and suicide rates?
- 14) Can cultural differences and experiences between countries help to treat difficult conditions? Can overlapping systems help to explain condition treatment failures?
- 15) Could personalized medicine benefit the current system?

## **12.7 CONCLUSIONS**

Use of CIM is increasing among civilian and Military populations. Financial support and standardized policy regarding CIM lags behind utilization. In response, the NATO Task Force HFM-195, Integrative Medicine

Interventions for Military Personnel, was formed to evaluate the current status of CIM within the militaries of the NATO participating countries. Although the Task Force was primarily an exploratory committee, CIM or IH2 offers a new perspective on healthcare delivery in Military organizations. Additional reviews and evaluations of IH2 with specific attention to the implementation of selected practices; development of educational programs for patients, providers, and policy-makers; evaluations of clinical outcomes and best practices; establishment of collaborative research endeavors focused on cost-effectiveness of individual modalities; and new paradigms and models of care must be considered. Improved international Military healthcare systems will ultimately benefit the readiness of troops, improve optimal performance of Military personnel and organizations, and sustain financial stability of Military organizations.

## **12.8 REFERENCES**

- [1] Belard, J.L. and Pock, A.R. Acupuncture and NATO. *Med Acupunct.* 2011;23(4):271-273.
- [2] BrainyQuote. Hippocrates quotes. [Internet]. [www.brainyquote.com/quotes/authors/h/hippocrates.html](http://www.brainyquote.com/quotes/authors/h/hippocrates.html), Accessed December 28, 2014.
- [3] Büsing, A. and Recchia, D.R. Spiritual and non-spiritual needs among German soldiers and their relation to stress perception, PTSD symptoms, and life satisfaction: results from a structural equation modeling approach. *J Relig Health.* Published online June 9, 2015.
- [4] Cant, S., Watts, P. and Ruston, A. The rise and fall of complementary medicine in National Health Service hospitals in England. *Complement Ther Clin Pract.* 2012;18(3):135-139.
- [5] Coulter, I.D., Ellison, M.A., Hilton, L., Rhodes, H.J. and Ryan, G.W. Hospital-Based Integrative Medicine: A Case Study of the Barriers and Factors Facilitating the Creation of a Center. Santa Monica, CA, USA: RAND Corporation; 2007. [Internet]. <http://www.rand.org/pubs/monographs/MG591>, Accessed June 10, 2015.
- [6] Office of the Army Surgeon General. Pain Management Task Force Final Report May 2010. [Internet]. [http://www.regenesisbio.com/pdfs/journal/Pain\\_Management\\_Task\\_Force\\_Report.pdf](http://www.regenesisbio.com/pdfs/journal/Pain_Management_Task_Force_Report.pdf), Accessed May 7, 2014.
- [7] Rakel, D. and Weil, A. Philosophy of integrative medicine. In: Rakel D, ed. *Integrative Medicine* Philadelphia, PA, USA: Elsevier; 2012:2-11.
- [8] Weir, T. Developing cultural fluency. ExecutivE. May 1, 2004. [Internet]. [www.executivemagazine/buzz/developing-cultural-fluency](http://www.executivemagazine/buzz/developing-cultural-fluency), Accessed June 10, 2015.

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## **Annex A – SUMMARY REPORT OF FIRST MEETING, 21-23 MARCH 2011**

**Theme: Group Kick-Off and Organization**  
**Venue: Val de Grace, Paris, France**

### **A.1 PARTICIPANTS/PROGRAMME COMMITTEE**

<b>Member Nations</b>	<b>Attendees</b>
France (Meeting Host)	Médecin en chef Marion Trousselard
Germany	Prof. Dr. Arndt Büsing
Hungary	Prof. Dr. Gabriella Hegyi
Italy	Dr. Paolo Roberti di Sarsina (Absent)
Netherlands	Dr. Jan van der Greef (Participant by phone)
United States	Dr. Jean-Louis Belard (Chair) Dr. Wayne Jonas COL Richard Petri, Jr.
Consultants and Guests	Captain Nathalie Babouraj (France) CPT Frederick Zimmermann, MA (Germany) COL Karl Friedl (United States) (Rapporteur) Dr. Lee Sanghoon, MD, PhD, Dipl Ac, LAc (Korea) MAJ David Williams (United Kingdom)
NATO STO Office	LtCol Ron Verkerk (HFM Panel Executive)

### **A.2 SUMMARY OF PRESENTATIONS**

#### **A.2.1 NATO RTO Orientation (LtCol Ron Verkerk)**

LtCol Verkerk outlined current trends and transformation in NATO (e.g., more international humanitarian missions), emphasized the need to articulate the value of integrative medicine to NATO, and talked about possible panel outcomes including development of a STANAG (Standard Agreement) to standardize procedures (e.g., pain management methods involving complementary and alternative medicine). He described the make-up of the Human Factors and Medicine group, with three Panels:

- Health and Medicine;
- Human Effectiveness; and
- Systems Integration.

He provided information about Nations that participate in NATO Panels, the rules concerning NATO support for up to two consultants to attend a workgroup meeting, and travel funding that can be made available for some country participants (e.g., BUL, EST, POL, POR, ROU, TUR). Korea and Singapore are relevant examples of

other countries that may be included in our workgroup. The purposes of the NATO RTO workgroups are to promote collaborative research, increase information exchange, maintain a technological lead, and advise NATO leadership on topics linked to Military need. There is one other current workgroup with some related interests (HFM-174, Lifestyle Effects on Military Fitness, headed by COL Leyk, Koblenz, Germany).

### **A.2.2 Chairman's Opening Comments, Introductions and Initial Discussion (Dr. Jean-Louis Belard)**

Dr. Belard outlined the membership (see “Programme Committee”) and made introductions. He outlined the near-term plan for meetings:

Fall 2011        Bologna, Italy (tentative)  
Spring 2012      Budapest, Hungary

Dr. Belard emphasized several key objectives for this meeting: What is available right now in your Military medical facilities, and in the civilian sector? What is the trend? More demand?

What is the most frequently used CAM interventions? We need to learn about each other's country, in order not to reinvent the wheel. Several examples of topics for inclusion in future workgroup discussion were suggested: placebo, phytotherapy, magnetic fields, and virtual reality.

### **A.2.3 Overview of U.S. Department of Defense CAM Research and Applications (COL Karl Friedl)**

COL Friedl outlined current research interests and clinical applications of CAM in the U.S. Department of Defense. Current emphasis in the DoD is on effects of Improvised Explosive Devices (IEDs), which include mild traumatic brain injury and PTSD as important public issues. Technological improvements such as better body armor protection for the torso have focused the injury emphasis on age-old problems of brain dysfunction and serious peripheral limb injuries. Virtual reality is being extensively applied in psychomotor training rehabilitation of amputees, as exposure therapy assist in treatment of traumatic spectrum disorders, in distraction therapy to reduce the need for pain medications, and for virtual human interactions to coach Service Members through an advanced social networking system. Integrative medicine concepts have reached high visibility within the U.S. DoD thanks to extensive efforts of numerous individuals at Military facilities, receptive leadership as well as civilian partners such as the Samueli Institute. Current research efforts are focused on providing accurate information and evaluating effectiveness of CAM approaches in Military applications. Acupuncture and comprehensive/integrative approaches are being extensively tested in pain management. Meditation and mindfulness training is being used to promote resilience, along with new studies to develop a better understanding of the scientific basis for aerobic exercise benefits to cognition and mental health. Technologies such as automated neuropsychological testing, cell phone based monitoring and feedback, and neuroimaging are important to research and delivery of some of the interventions. COL Friedl emphasized some areas of importance to this Panel for NATO consensus/standardization including acupuncture for battlefield pain and reduction of medication; mindfulness training to enhance psychological stress resilience (possibly synchronized with HFM-174); and neuroprotective nutrition and supplements.

### **A.2.4 Emerging Trends in CAM (Dr. Wayne Jonas)**

Dr. Jonas presented a high-level view of integrative health and healing with a special focus on healing, the natural process of repair (healing is not the same as cure!). Dr. Jonas and the Samueli Institute have been important partners and subject-matter experts advising the U.S. DoD on integrative medicine evaluation and

implementation. The investment in CAM is relatively small in the United States; back and head pain is one of the top reasons for using CAM. One practical way to organize components of integrative health is into psychological resilience, physical exercise and sleep, optimal nutrition and substance use, and social integration. This is surrounded by system wellness, integrative medicine, lifestyle/behaviour, and healing environments. There is a range of militarily-relevant problems that can be described as related aspects of “trauma spectrum disorder”, including: pain; PTSD; anxiety; post-concussive syndrome; substance dependence; abuse and tolerance; depression; and somatic dysfunction such as disturbances in sleep, appetite, libido and energy. These are highly relevant Military problems described variously as “mind/brain injury” by psychiatrists, “war-related trauma” by neurologists, and “exposure to blast head injury” by orthopedic/trauma surgeons. Pouring money into pharmaceutical research gives us the results we paid for – a focus on medication. Placebo is a highly effective treatment and should be renamed to highlight its specific benefits, and it should be given much more attention and study. One conclusion was that “placebo” should be a major focus for future workshops by this group, both from the standpoint of an effective intervention and for its proper interpretation and comparison in some CAM studies.

#### **A.2.5 Integrative/Complementary Medicine in Germany – Spirituality as a Resource to Cope (Prof. Dr. Arndt Büsing)**

Dr. Bussing discussed utilization of CAM in Germany and outlined some of the types of occidental (non-Asian) CAM such as anthroposophic medicine, homeopathy, osteopathy, natural products, mind/body medicine, alternative medicine, and spirituality that are the focus of research at the Center for Integrative Medicine (CIM). Age, gender, attitudes and convictions are important demographics in use; older adults, women, and individuals with chronic disease use more CAM interventions. CAM may or may not include other adjuncts such as praying or use of vitamins; prayer is a popular CAM modality in both USA and German surveys. Use of medications does not heal suffering; suffering is an affective implication between symptoms and quality of life that requires a multi-modal integrative strategy spanning mind, emotion, and physiology. Mindfulness was discovered to be the key predictor of “Inner Congruence and Peaceful Harmony (ICPH)” that came from various mind/body interventions such as yoga and meditation. Mindfulness (which can be trained, as an intervention) is statistically associated with quality of life mediated through ICPH, life satisfaction, and lightheartedness/easiness. Spirituality/Religiosity (SpR) can improve long-term adjustment to chronic disease or trauma through a range of effects ranging from “life has meaning” to emotional comfort to compassion for others. For some, religious terms such as God, Jesus, and church are a turnoff but are not required for discussion of spirituality. Spiritual needs range through a theoretical hierarchy including social (connection), emotional (peace), existential (meaning/purpose), to religious (transcendence). Belonging and partner communication are examples of spiritual needs at the social level, while meaning in life and self-actualization are needs at the existential level. SpR is an important coping resource and affects resilience, moderating life stressors, enhancing coping ability (reducing vulnerability), and benefiting health outcomes. Dr. Bussing explained a concept called SpREUK (SpR in chronic illness) as a reflective process involving search, trust, and reflection. He traced a relationship in chronically ill patients between pain severity, levels of perception/experience of God, positive experiences, and happiness. Educated women with chronic pain were most receptive to SpREUK. Happiness, inner peace, active giving, empathy, and consciousness are all important parts of this SpREUK model. Although spiritual support is significantly associated with QoL, patients with chronic disease do not feel that their spiritual needs are adequately met within the medical system or by the medical doctors; this should not only be provided at the end of life. Life satisfaction and emotional acceptance of disease are associations/predictors of depression and addiction. The presentation ended with discussion of the putative relevance to Military personnel especially for coping strategies that affect psychological resilience (e.g., the role of unit cohesion and personal relationships within Military units). CPT Fred Zimmermann suggested that religiosity might be substituted by beliefs within a Military group where personal relationships are central motivations.

#### **A.2.6 CAM in Hungary – CAM in Military Medicine, New Techniques (Prof. Dr. Gabriella Hegyi)**

Dr. Hegyi outlined a large variety of CAM techniques employed in the Central Military Hospital including acupressure, acupuncture, and massage. Acupuncture and laser acupuncture has been applied to more than 100,000 men and women in the Military hospital for a wide variety of pain conditions with long lasting good results. The usual protocol is 15 sessions per treatment course and 2 courses of treatment per patient in a year. A new technique of permanent acupuncture was described; fMRI and thermography of the hands demonstrated changes in response to the de qi (needling sensation). Indices of joint tenderness and range of motion were described and applied in studies using acupuncture with placement of monofilament in stroke and other brain damaged patients. Preliminary results suggest good results with reduction in medications and better patient outlook. The Yamamoto (YNSA – Yamamoto Neue Schadelakupunktur) acupuncture method based on a scalp somatoform is used in a special clinic in the Military hospital. A wide variety of successful cancer treatments using hyperthermia (“oncotherapy”) were described.

#### **A.2.7 Is Integrative Medicine the New World Practice? (COL Richard Petri, Jr.)**

COL Petri presented a formal lecture based on an award-winning presentation at the AMSUS (the key Military/federal medicine) meeting last year focused on new CAM paradigms for today's ineffective medicine; he is a pioneering leader for integrative health in the DoD. He called for a holistic multi-disciplinary approach to health and healing; a return to our “roots” (literally depicted as a caveman eating roots for therapy – suggesting that we have come in a full circle back to acquired wisdom that may still not be scientifically understood); participation in our own health; the misdirection of medicine focused on diagnosing disease; a call for distinguishing between proven and unproven therapies instead of conventional vs. unconventional; evidence-based medicine versus patient-centered care; use of natural abilities to heal rather than substitution with medications. The Army pain management task force report was discussed; this calls for an integrative approach to pain management that is less reliant on use of drugs. Overall, COL Petri made a strong case for culture change and highlighted how a shift to integrative medicine that includes CAM is occurring in Military medicine.

#### **A.2.8 Systems Approach to Integration of Occidental and Eastern Wellness and Healing Traditions (Dr. Jan van der Greef)**

Dr. van der Greef outlined an integrative (systems biology) approach to reducing healthcare costs while providing improved personalized care (“get the right drugs to the right patients – right route, right dose, right time”). He highlighted the large number of patients who suffer side effects and no benefits from standard medications. Several examples highlight the need for a systematic approach to complex dynamic systems, especially in the integration of different points of view (e.g., Occidental and Eastern Medicine). There are things that can't be learned from a genome (e.g., the same genome does not distinguish between the caterpillar and the butterfly – one genome but two very different states). A key goal of an integrative holistic approach to medicine is to detect homeostatic changes even before current ability to diagnose disease. Then, interventions can keep the process in check or even reverse pathology and sustain normal health (i.e., instead of “disease management”, the emphasis can be on “health promotion”). Several examples of systems biology studies were presented to highlight the complex relationships between genomic, transcriptomic, proteomic, and metabolomic measurements. Comparison of the correlation networks between control, disease, and drug treated animal models of Type 2 diabetes highlighted the unmet biochemical need that remains after standard drug treatment as well as biochemical side effects that arise. These are highly interconnected, dynamic, and non-linear. Patterns of self-organization are the key! Western medicine has been focused on “the war against ...” and often focused on biochemical (drug) interventions, with less consideration to social, psychological, and behavioural dimensions. Other problems involve the translation of data into wisdom (the DIKW paradigm). A systems approach can be

applied to bring Western and Chinese Medicine into one model with a scientific fusion without having to first resolve philosophical differences. The salutogenic model that supports human health and well-being rather than on factors that cause disease was discussed as the overarching concept of detecting and moderating allostatic load and promoting resilience in the systems approach. Rheumatoid arthritis was used as an example to compare the 1 disease-1 target-1 drug fits all blockbuster approach compared to an integrated intervention involving lifestyle, nutrition, multi-dimensional pharmacology, and psychology. A final systems approach example was provided with the antimicrobial action of berberine (from a medicinal plant) and how the benefits are overlooked in a reductionist evaluation. Dr. van der Greef concluded with a brief description of the Sino-Dutch Centre for Preventive and Personalized Medicine (SD PPM) consortium that is focused on new systems insights to health and disease and the fusion of Western and Eastern perspectives for “personalized system wellness”.

#### **A.2.9 French Military Effort in Integrative Medicine (Médecin en chef Marion Trousselard)**

MC Trousselard described the use of integrative medicine in the French Military to maintain health of Soldiers from enlistment to retirement. Osteopathy and homeopathy are accepted in France; primary use is of homeopathy, with higher prevalence of use by women. There is no medical reimbursement for use of CAM. Systematic Military data is lacking but CAM practices are often reported, even though CAM is stigmatized in the Military environment. The Air Force has been a leader in advancing integrative approaches in stress reduction. These include deep breathing exercises, hypnotherapy, progressive relaxation, and guided imagery; these are used in various combinations before, during, and after stressful activities. A team program has been developed for the implementation of this TOP (Techniques d'Optimisation du Potentiel) program, and is widely used by air traffic controllers and pilots, as well as some physicians in complex shifts in the intensive care unit and troops in Afghanistan. A new program combining TOP and Cardiac Coherence (CC, Heart Math) was evaluated. This focuses on breathing and emotional states, using the autonomic nervous system (heart rate variability) for biofeedback. Heart rate variability responses are different between the TOP and CC programs; CC appears to increase the mindfulness state. Mindfulness is important to reducing psychological reactivity, improving appropriateness of responses to stressful challenges, and improving self-acceptance. Mindfulness has old traditions in Buddhism and in the Samurai (goal: uncluttered mind and not emotionally attached to an outcome). Meditation techniques take more time than CC practice. A comparison study with first-year medical students was conducted with CC (1 h/wk. x 6 wk.), TOP (1 h/wk. x 6 wk.), and control groups. Preliminary data indicates markers of dopamine and serotonin turnover were increased in the CC and TOP groups compared to controls post-training and pre-examination. Another study with firefighters showed sex differences in heart rate variability responses, especially with TOP. Both TOP and CC programs can modify allostatic load. The endobiogenic approach considers multiple interdependent neuroendocrine axes in psychological distress that may all be normalized with effective integrative interventions. Two loops were described in detail: Loop 1 – prepares organism for response with preponderance of catabolic responses; Loop 2 – returns organism to “baseline” prior to stressor response with more anabolic responses; maladaptation is due to a failure in this loop and continued new response. A study of allostatic responses and psychopathological vulnerability was described; this involves forces deploying to Afghanistan. MC Trousselard speculated on the future use of CAM in French Military medicine to include TOP and CC to reduce risk of PTSD and endobiogenic index to screen for early integrative medicine interventions.

### **A.3 SUMMARY OF DISCUSSION**

The group agreed on important early steps to include:

- Defining CAM, focusing on “Integrative Health and Healing” rather than “Integrative Medicine”. We should not try to change the name of the HFM but this improved title that better captures the correct emphasis on health instead of disease can be the first committee recommendation for the final report.

- Description of why this is important to the modern Military. This needs to be emphasized in every workshop, with an eye to providing recommendations for standardization and scientifically mature interventions across NATO forces.
- Outlining legislation/rules for CAM by participant Nations. Some of this was accomplished in the presentations at this first meeting. A chapter or appendix of the final report should summarize primary categories of CAM (perhaps the 5 categories outlined by Dr. Belard) and levels of acceptance and use in the countries represented in this workgroup (DEU, FRA, HUN, ITA, NLD, NOR, USA). This would include what is reimbursed/provided on a national level, acceptance and use in Military medicine, and current national research and trends.
- Choosing an approach to organize the work effort centered on therapies (e.g., acupuncture) or problems (e.g., pain). Initial proposal is to focus on three main themes in workgroup meetings:
  - Pain management;
  - Resilience/performance optimization; and
  - Trauma spectrum response.
- The next meeting is tentative scheduled to occur in October 2011.

Annex completed by HFM-195 Rapporteur, COL Karl Friedl.

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## Annex B – SUMMARY REPORT OF SECOND MEETING, 19-21 OCTOBER 2011

**Theme: Acupuncture and Acute Pain Management**

**Venue: Ordine dei Medici Chirurghi e degli  
Odontoiatri di Bologna, Bologna, Italy**

### B.1 PARTICIPANTS/PROGRAMME COMMITTEE

Member Nations	Attendees
France	Médecin en chef Marion Trousselard Captain Nathalie Babouraj Dr. Rafael Nogier Dr. Laurent Bezin
Germany	Prof. Dr. Arndt Büssing CPT Frederick Zimmermann, MA
Hungary	Prof. Dr. Gabriella Hegyi
Italy (Meeting Host)	Dr. Paolo Roberti di Sarsina
Netherlands	Dr. Jan van der Greef (Absent)
United States	Dr. Jean-Louis Belard (Chair) Dr. Wayne Jonas COL Richard Petri, Jr. Dr. Richard Niemtzow COL Karl Friedl (Rapporteur)
Consultants and Guests	Dr. Sunghoon Lee (Republic of Korea) MAJ David Williams (United Kingdom)

### B.2 SUMMARY OF PRESENTATIONS

#### B.2.1 Chairman's Opening Comments, Introductions, and Initial Discussion (Dr. Jean-Louis Belard)

Dr. Belard reviewed the membership (see “Programme Committee”) and made introductions. He outlined the near-term plan for meetings:

Spring 2012      16-18 April Budapest, Hungary  
Fall 2012      Date TBD Amsterdam area, Netherlands

Dr. Belard emphasized several key objectives for this meeting:

- Presentations on national and Military CAM practices from countries that had not previously presented.
- Pain management approaches, with a special focus on acupuncture treatment.

- Continuing discussion of standardization of procedures, and recommendations and specific products for NATO.

### **B.2.2 Considerations for Generalizable Use of Acupuncture for Acute Pain Management in NATO (COL Karl Friedl)**

COL Friedl outlined approaches and considerations (Doctrine, Organization, Training, Leader, Development, Material, Personnel, Facilities – DOTLMPF) for Military implementation and for NATO standardization of acupuncture as a first set of recommendations for CAM use in the Military forces. Key questions posed at the end of the presentation were:

- Can we reach consensus on accepted standards for acupuncture and acute pain?
- Can we describe the regulations and laws of each represented country that are relevant to NATO-wide recommendations?
- Can we outline a process for standard use of acupuncture for acute pain by NATO healthcare providers? For medics?

He summarized some relevant conclusions from the U.S. DoD Pain Management Task Force<sup>1</sup> and highlighted these two quotes from the report:

*Pain medicine should be managed by integrated care teams, which employ a biopsychosocial model of care. The standard of care should have objectives to decrease overreliance on medication driven solutions and create an interdisciplinary approach that encourages collaboration among providers from differing specialties.*

*The DoD should continue to responsibly explore safe and effective use of advanced and non-traditional approaches to pain management and support efforts to make these modalities covered benefits once they prove safe, effective, and cost efficient.*

### **B.2.3 Psychosocial and Spiritual Needs (Prof. Dr. Arndt Büssing / Médecin en chef Marion Trousselard)**

Dr. Büssing summarized multi-model treatment strategies that address psychosocial and spiritual needs in an overall integrative wellness program, and he described specific research collaborations that have developed since the HFM-195 meeting in Paris.

The overarching model involves four levels: social (connection) – emotional (peace) – existential (meaning/purpose) – religious (transcendence). Primary outcome measures relate to life satisfaction, which, in turn, affects specific needs, salutogenic resources, cognition, emotion, and eventually palliative care.

A French/German collaboration was initiated following the Paris HFM meeting to identify specific needs and salutogenic resources and further explore relationships between mindfulness and life satisfaction, stress, and other factors (sports involvement, years in a job, age, etc.). Survey data has been collected and is being analyzed.

<sup>1</sup> Pain Management Task Force, Final Report, May 2010, Office of the Army Surgeon General <http://www.dvcipm.org/files/reports/pain-task-force-final-report-may-2010.pdf>.

### **B.2.4 Overview of CAM Practices in Italy and Introduction to CAMbrella (Dr. Paolo Roberti di Sarsina)**

Dr. Roberti di Sarsina reviewed CAM usage and policies in Italy. Only physicians and dentists are allowed to practice CAM. Needs better regulation as Italy has too many very different regional policies. Person-centered medicine is at the interface of traditional CAM and non-conventional medicine. He described the European Association for Predictive, Preventive, and Personalized Medicine (EPMA) World Congress, as well as the CAMbrella network<sup>2</sup> and their efforts to standardize and promote use of CAM. He described the CAM philosophy as “a way to observe nature”.

Key goals are to provide treatment choices, solve reimbursement issues, and ensure attention to safety aspects. Progress to these goals is hampered by the diverse classification systems for CAM practices, diverse legislation (even within Italy), education and training, and clear treatment definitions.

### **B.2.5 Auriculotherapy (Dr. Raphael Nogier)**

Dr. Nogier gave a succinct overview of the basis of auricular acupuncture. He started with a simple example of the concept where a thumb pinched by a large clip causes the upper ear to be especially sensitive to pain. Identification of such painful points in the ear can be used to treat pain. Another example is the treatment of trauma spectrum disorder where a patient talks about a trauma in their life while needled along specific auricular points (the “sensory line” or “sound line”, along the lower portion of the ear) and the traumatic association dissipates. There was discussion about specific points Shen Men, Point Zero, Master Cerebral, etc., and consistency between other acupuncture philosophies and the unifying auricular approach.

Some of the physiological bases of the effects were discussed, culminating with a very interesting mammalian exception – the naked mole rat (*Heterocephalus glaber*). This species does not regulate body temperature well (unlike all other mammals), has no auricle (!), and has no Substance P (a key neurotransmitter modulator of pain associated with noxious chemicals). This species does not develop cancer and has extraordinarily long life. Somehow all these pieces are related and will be further explained now that the complete genome has been sequenced.

### **B.2.6 Protective Environments (Dr. Laurent Bezin)**

Dr. Bezin provided an overview of the multiple dimensions affecting cognitive reserve and emotional stability, including current scientific studies in animals. Protective environments or “safe/secure environments” enhance this reserve and stability. He offered a definition of resilience:

*Psychological resilience comprises the sum total of psychological processes that allow subjects to retain or return to baseline functioning following some kind of adverse experiences.*

The presentation included discussion of the emerging understanding of neurophysiological mechanisms based on studies of key markers of “perception of wellness” such as p11 protein and TP-13 and 5HT-2A receptor antagonist studies.

### **B.2.7 TOP Interventions and Yogatherapy (Captain Nathalie Babouraj)**

Captain Babouraj described the yoga concept and illustrated the practical and safe applications for the Military (including a practical demonstration at the start of the daily session). She described the 5 Kashas involved in

<sup>2</sup> [www.cambrella.eu](http://www.cambrella.eu).

yoga principles (symbolically summarized in the image of Krishna in the frontispiece image at the beginning of this report): physical body (physical/biological substratum), energy (sensations – “Prana”), mental (experimental – visualization exercises), wisdom, and bliss. There was also a concise summary of other related parts of the concept (yamas, nuamas, asanas, etc. – non-violence against self, etc.). The goal of yoga and meditation is to quiet the mind, pushing out intrusive thoughts that contribute to adverse health, and to move through the levels to achieve wisdom and bliss. There are parallels to Herbert Benson’s concepts of relaxation therapy and these approaches contribute to mental and physical resilience. Capt. Babouraj emphasized the concept of a three-legged stool in medicine that involves pharmaceuticals, surgery/medical procedures, and individual self-care; this third leg is central to integrative wellness. In a second portion of the presentation, Capt. Babouraj talked about the TOP program and new experiments and advances in required Military training.

### **B.2.8 Yoga in Clinical Studies and Acupuncture in Emergency Medicine (Prof. Dr. Arndt Büssing)**

Dr. Büssing presented a summary of the effects of yoga in clinical studies and the first interim results regarding the effects of acupuncture in emergency medicine. After outlining the multi-modal concepts in the treatment of patients with chronic pain and the integrative strategy, the impact of yoga was shown on performance, physiology, psychology and spirituality. Yoga shows positive effects on the treatment of depression, anxiety, stress and pain. Studies indicate that yoga reduces perceived stress as effectively as relaxation or cognitive behavioral therapy. Yoga appears to provide preventive medicine benefits in cardiovascular diseases, diabetes mellitus management, and lung function.

The second part of his presentation focused on the impact of acupuncture in emergency medicine. Preliminary results of the evaluation of acupuncture in emergency rooms show that acupuncture can be an analgesic intervention for patients with acute injury to the extremities and that acupuncture and conventional treatment are equally effective to reduce pain. Also, simple auricular acupressure is an effective treatment for anxiety in prehospital emergency settings. Dr. Büssing suggested that the use of acupuncture treatment should be to relieve symptoms and rapidly stabilize patients (within 3 to 5 minutes), or otherwise use standard conventional treatment.

### **B.2.9 Mindfulness Clinical Applications (CPT Frederick Zimmermann, MA)**

CPT Zimmermann presented the highlights of a comprehensive review of mindful techniques (MBSR, MBCT, DBT, ACT, DP). He took a few in-depth examples with Mindfulness-Based Stress Reduction (MBSR), Mindfulness-based Mind Fitness Training (MMFT), and Emotional Freedom Technique (EFT); all include aspects of developing “meta-awareness”. He offered a definition of mindfulness as:

*Non-judgmental awareness where each feeling or emotion is acknowledged and accepted for what it is.*

Buddhist precepts were also presented in the context of mindfulness and similar to the yoga concepts presented by Capt. Natalie Babouraj:

*Freeing oneself from distracting thoughts and cultivating a non-judgmental mindset by being aware of the present moment.*

One can only be angry about past events and anxious about future events; mindfulness training deals with both of these. A demonstration of mindfulness techniques was presented at the start of the last day of the meeting.

Various research concepts were proposed that could include ISAF troops and a concept to look at cultural differences in PTSD rates based on psychosocial factors such as Chinese concepts of “me as a partner, me with a specific function in a unit, etc.” vs. “individual”.

### **B.2.10 Yamamoto Scalp Acupuncture in Pain (Prof. Dr. Gabriella Hegyi)**

Dr. Hegyi provided a detailed summary of the Yamamoto method of acupuncture that is practiced in her clinic for Military members. This method is based on scalp locations. Various techniques for chronic use such as implanted filaments were described. The Yamamoto New Scalp Acupuncture (YNSA) is especially used for pain associated with locomotion.

### **B.2.11 Acupuncture in Traditional Korean Medicine (Dr. Sunghoon Lee)**

Dr. Lee reviewed Korean use of traditional medical practices and provided an overview of the very elaborate system of determining beneficial acupuncture points for individual patients based on multiple factors. This included the use of grids covering the side of the head, including many points on the ear. The KOR relies on medication for anesthesia but can also use acupuncture. The ROK has traditional medical doctors in all branches and in public service (as part of the 36-month public service requirement for all males). The philosophy behind the treatment approaches were also discussed involving the four elements (sky, earth, fire and water), “Saam” – the four needle technique, and specialized forms of acupuncture were also described such as bee venom acupuncture and herbal acupuncture.

### **B.2.12 Battlefield Acupuncture (Dr. Richard Niemtzow)**

Dr. Niemtzow described the approach to Battlefield Acupuncture (BFA) using 5 points in the ear that has been taught to many physicians in the U.S. Air Force. He outlined a demonstration project that used this technique with injured Soldiers during air evacuation from Afghanistan to Landstuhl, Germany. He also reported on several forthcoming publications and a new journal that he edits (Medical Acupuncture, Mary Liebert Press). Special Operations Command gives out needles instead of narcotics as a first choice for pain management. The approach is effective, works rapidly, and is easy to use. The five points in the ear used in BFA are shen men, cingulated gyrus, omega 2, thalamus, and point zero. Pilots grounded for pain treatment medications, but not for acupuncture. Risks associated with BFA could be covering up pathology so the technique needs to be incorporated into good medical practices (e.g., pain from a leg fracture was treated with BFA and the individual continued to walk on it when they should have been treated for fracture). The ear sites are very convenient for access when other parts of the body may be more difficult to treat.

## **B.3 SUMMARY OF DISCUSSION**

The group discussed:

- Could we collect the information from each NATO Nation on CAM usage? Perhaps start with CAMbrella data, include the USA, and bring in the Military?
- Trauma spectrum gets to the tip of the spear and should be a key focus.
- Dr. Jonas shared copies of a special Military Medicine journal supplement on Integrative Health.
- How to organize the final report. Sharply defined chapters vs. one continuous essay? Organize around prehospitalization, hospitalization, and rehabilitation? Systematic review??

The next meeting is scheduled for 16-18 April 2012 in Budapest.

Annex completed by HFM-195 Rapporteur, COL Karl Friedl.

## **Annex C – SUMMARY REPORT OF THIRD MEETING, 16-18 APRIL 2012**

**Theme: Integrative Health Interventions to Improve Resilience**

**Venue: Stefania Palota, Budapest, Hungary**

### **C.1 PARTICIPANTS/PROGRAMME COMMITTEE**

<b>Member Nations</b>	<b>Attendees</b>
France	Médecin en chef Marion Trousselard (Absent) Captain Nathalie Babouraj Dr. Rafael Nogier (Absent) Dr. Laurent Bezin
Germany	Prof. Dr. Arndt Büssing (Absent) CPT Frederick Zimmermann, MA
Hungary (Meeting Host)	Prof. Dr. Gabriella Hegyi
Italy	Dr. Paolo Roberti di Sarsina
Netherlands	Dr. Jan van der Greef (Absent)
United States	Dr. Jean-Louis Belard (Chair) Dr. Wayne Jonas (Absent) COL Richard Petri, Jr. Dr. Richard Niemtzow (Absent) COL Karl Friedl (Rapporteur)
Consultants and Guests	Dr. Nisha N. Money (United States)

### **C.2 SUMMARY OF PRESENTATIONS**

#### **C.2.1 Chairman's Opening Comments, Introductions, and Initial Discussion (Dr. Jean-Louis Belard)**

Dr. Belard outlined the tasks for the meeting and reviewed the agenda. In some respects, this meeting agenda is structured to accomplish a deeper-than-previous discussion of traditional medicine approaches (e.g., Tibetan, Japanese/Chinese, and Indian Ayurvedic medicine) and their potential applications (and actual implementation) in USA and European medicine today.

He also revisited several key questions that have been carried over from previous meetings:

- 1) Can we collect info on CAM usage for each NATO Nation?
- 2) Should we focus on trauma spectrum?
- 3) How do we share published reports and resources?

The organization of the report was also to be discussed and writing assignments made.

The remainder of the group's meetings have been planned and dates assigned:

- Amsterdam 2012: October 8-10 (POC: Dr. Jan van der Greef) – *East/West integration and CAM interventions metrics.*
- Cologne 2013: April 22-24 (POC: CPT Frederick Zimmermann, MA) – *IM as a tool to enhance performance and wellness.*
- Paris 2013: October (to be determined) – *Finalization of our recommendations to the leadership.*

Dr. Belard concluded with a summary of the new issue of Medical Acupuncture, edited by Dr. Niemtzow that focused on Military acupuncture, with great relevance to the key theme and presentations of the previous meeting in Bologna.

### **C.2.2 Welcome and Overview of Yamamoto Acupuncture and Resilience (Prof. Dr. Gabriella Hegyi)**

Dr. Hegyi provided a very generous welcome and overview to the group on Hungary, Budapest, and then described CAM activities in the Military and civilian communities. CAM and natural healing is a legally approved component of Hungarian patient care since 1997 legislation, and the Hungarian Academy of Sciences has been increasingly accepting of CAM procedures as scientifically proven and acceptable for use by physicians, and some procedures by non-physicians. Acupuncture is one of those techniques, with approved applications in substance abuse treatment. Dr. Hegyi described one of her long-term studies on the application of permanent biostimuli on acupoints in the scalps of Military personnel to aid in stroke rehabilitation. She also described participation in a CAMbrella grant to evaluate the use of CAM in 12 European countries. Dr. Hegyi reported on a recent National Health Service of Hungary survey that found 44% of Hungarian Military personnel use CAM procedures (including 24% herbal therapies and 9% acupuncture; and others used yoga and meditation). Most common treatments were for cervicobrachiale syndrome and migraine. There is concern that older Military physicians skilled in acupuncture are retiring but there is resurgence in young medical students in civilian universities where the techniques are being taught (not in the Military medical curriculum). CAM procedures offered at the Central Military Hospital in Budapest include laser and magnet field therapy and these are being taught to Military students. Dr. Hegyi presented a very comprehensive overview of the Yamamoto acupuncture foundations and techniques, particularly the MAPS (Microacupuncture Point Systems) and the wide range of conditions that are treated through this treatment modality.

### **C.2.3 Tibetan Personalized Medicine (Dr. Paolo Roberti di Sarsina)**

Prof. Roberti di Sarsina presented a talk that was largely based on his recent publication on Tibetan medicine.<sup>1</sup> He described one of the world's oldest traditional medicine systems that include diagnostics, preventive medicine, and individualized medical treatments, offering this as a model with lessons for today's integrative medicine programs. Early shamanistic practices were incorporated into every important aspect of life and involved practices for balancing one's body internally and externally. Herbal remedies were developed for wound healing and other medical treatments in harsh environments. The spread of Buddhism in Tibet provided an overarching spiritual focus but incorporated medical knowledge from the indigenous Bon doctors as well as Indian and Chinese practices. Early in life, ones disease susceptibilities are identified according to their humor (wind; fire; earth and water) and appropriate preventive measures can then be recommended to optimize individual lifetime health (e.g., those with fire humor are prone to skin diseases and infection and can take steps

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<sup>1</sup> Roberti di Sarsina, P., Ottaviani, L. and Mella, J. Tibetan medicine: a unique heritage of person-centered medicine. *EPMA Journal* 2011;2:385-389.

to avoid these problems); a modern parallel would be to use genetic testing and family history to identify disease susceptibilities and then advocate practices to reduce those risks. In the Tibetan tradition, the doctor works with the patient and their community to support balance and health, including such interventions as herbal remedies, meditations, and Tibetan Yantra Yoga exercises. Current day translation and preservation of these practices includes efforts by groups such as the Shang Shung Institute to promote some of the techniques such as Kunye Tibetan massage in Western medicine. There is an urgent need to rescue, translate, and document these practices before they are lost in the Tibetan cultural upheaval. Expert translations of existing texts are lacking and especially difficult because of the nuanced Dharmic literary language. Research into the properties of Tibetan herbal formulas is also vitally important, and difficult because of the combination of herbal ingredients that are central to Tibetan medicines (e.g., multi-ingredient formulas from the Padma Company that produces a few standardized Tibetan medicines from Switzerland following traditional Tibetan practices).

Prof. Roberti di Sarsina also provided a copy of an extensive briefing (211 slides) entitled “Le Medicine Tradizionali e Non Convenzionali – Dal data epistemologico alla realta sociale – Verso la Medicina Centrata sulla Persona” as well as copies of 5 recently published articles from his group.

#### C.2.4 Integrative Strategies Involving Neuroprotective Nutrition (COL Karl Friedl)

COL Friedl presented an overview of the scientific basis of neuroprotective nutrition, drawing heavily on the recent 400+ page report from the Committee on Military Nutrition Research (Food and Nutrition Board, Institute of Medicine)<sup>2</sup>. Based on emerging data, there are several reasons to consider whole food or dietary supplements to moderate Soldier health and performance in the context of integrative health: there is clear evidence that some food derivatives may restore neuronal homeostasis and promote neural repair; other diets (e.g., rich in fats and sugar) have detrimental effects on neuronal function and plasticity; this is a potentially safer intervention than the use of neuroprotective drugs; nutritional/metabolic interventions fit the concept of integrative health strategies, including an important interaction with exercise; and nutritional intake may significantly optimize neurophysiological resilience. There are numerous candidate biological mechanisms for nutritional interventions in neuroprotection including: oxygen scavenging properties (antioxidants), anti-inflammatory properties, effects on brain blood flow, reduction of neuronal cell death, regulation of iron homeostasis, and many other potential intervention points/benefits such as moderating pain and edema. Key candidates for potential Military use include: omega 3 fatty acids (notably EPA and DHA), caffeine, creatine, polyphenols including flavanols (many compounds in this category such as galli-catechins, resveratrol, and curcumin), and other specific vitamins and minerals such as zinc, Vitamin D, and Vitamin E. In many cases these are reflected in whole food sources and the combinations (instead of isolated compound) may be more beneficial; some of these foods include: ginseng, turmeric, blueberries, cherries, onions, red wine, green tea, dark chocolate, etc. It was emphasized that it is important to conduct evaluation of safety of the supplements because if they are biologically effective, they probably have potential for adverse effects in unnatural doses (e.g., Vitamin D). The other key point of this presentation was the importance of understanding the scientific basis for the action of these foods or supplements in order to be able to use them most effectively (e.g., if the primary neuroprotective benefits of omega-3 are provided by the metabolic conversion of EPA and DHA to protectins and resolvins, acting on microglial cells in the brain to dampen inflammatory responses after a head injury event such as blast induced TBI, the ratio of these compounds may be an important consideration, etc.). Approaches to integrating neuroprotective nutrition into use were also discussed, with the Samueli-led “superchicken” study used as a novel example (i.e., chickens with elevated tissue levels of omega-3s that do not taste fishy and, when consumed, boost circulating levels in humans). Several urgently needed studies were briefly outlined and discussed.

<sup>2</sup> Erdman, J., Oria, M. and Pillsbury, L. (eds.). Nutrition and Traumatic Brain Injury. Improving Acute and Subacute Health Outcomes in Military Personnel. Committee on Nutrition, Trauma, and the Brain. Food and Nutrition Board. Institute of Medicine. *National Academy Press*: Washington, DC, USA, 2011.

### **C.2.5 Resilience Program at Fort Bliss, Texas (COL Richard Petri, Jr.)**

COL Petri presented an update on the Integrative Health and Healing initiatives at Ft Bliss, TX, USA. He described how this significant U.S. DoD effort began in November 2003 with the establishment of the Center for Integrative Medicine, which initially provided acupuncture, and chiropractic services and now offers a holistic approach to pain with a full range of modalities. The Center provides complementary modalities especially for difficult medical conditions. A new facility was opened in December 2008 and the name changed to the Interdisciplinary Pain Management Center (IPMC) in 2012. The Center includes research and conducted the first Military chiropractic study for acute low-back pain in the USA, in collaboration with the Samueli Institute and Palmer College of Chiropractic. As a result of the study, Congress mandated a follow up study with \$7.2 M funding.

COL Petri described typical stove-piped systems of separate clinics for separate forms of care and then described the integrative model that is gaining traction in the U.S. DoD, including community, patient, and provider, with the patient taking increased responsibility for their wellness, and with interlocking components of education, clinical care, and research. He highlighted the integration of conventional and complementary medicine approaches, and described specific types of integrative medicine modalities offered in the IPMC. Research was described for three projects:

- A survey of CAM services in the DoD;
- A needs assessment among Military spouses of Active Duty personnel; and
- A study of relaxation response training for PTSD prevention in Soldiers.

The concept of operations for a much more ambitious change in the way medical care is delivered was described as part of the new Wellness Fusion Center. The intent of this Center is to provide a centralized approach to comprehensive fitness for Soldiers and family members, bringing in all the available resources from other centers and community activities and incorporating each of the comprehensive fitness core dimensions (physical, emotional, social, family, and spiritual). He described the hierarchy of integrative treatments provided at various tiers, the organization and staffing of the center, and the focus on pain management and the recommendations of the pain management task force. COL Petri summarized recent results on who uses CAM in the DoD, who provides the services, who pays for it, and the increase in services offered at most Army medical facilities between 2005 and 2009.

### **C.2.6 Yoga Data on Resilience (Captain Nathalie Babouraj)**

Captain Babouraj gave a new talk on the application of yoga to improve resilience. The concept of resilience was defined and presented in the context of PTSD prevention and mitigation. Behavioral health interventions that may have a huge impact on Soldier health and readiness are among the most unappreciated and underfunded efforts, compared to other healthcare investments such as providing medical care for disease treatment. Capt. Babouraj outlined behavioral education and mind/body programs that are currently being investigated in the French Military including yoga, TOP, and mindfulness. Hypotheses for the mechanisms involved in resilience enhancement include enriching an individual's "emotional bank account", enhancing the ability to bounce between the 5 Kosha layers (through postures, breathing exercises, sensory awareness, concentration, and meditation), mindfulness with the battle image and capacity for witnessing, and a process of "here and now" that avoids entrenchment of a trauma memory. A review of the literature and some specific studies and surveys highlighted the emerging understanding of empirical benefits and effectiveness of yoga, relaxation, and mindfulness training; the mechanisms of stress mitigation and enhancement of well-being, resilience, and Soldier performance; and approaches to building a resilience healthcare model. Information about the 1<sup>st</sup> World Congress on Resilience (Paris, France, 7-10 June 2010) was also provided.

### **C.2.7 Global Healing Techniques and Initiatives to Maximize Treatment, Resilience, and Human Performance for Military and Veteran Communities (Dr. Nisha N. Money)**

Dr. Money provided a comprehensive overview of the U.S. DoD investment in CAM research and implementation. Many interesting concepts on how the U.S. DoD program is organized and summaries of the funded programs were presented from a detailed 108-slide presentation deck:

- According to one U.S. survey, prayer is the most used CAM therapy in the civilian population<sup>3</sup>, ahead of natural products, meditation, yoga, etc., while, in another survey, U.S. physicians tend to recommend relaxation and biofeedback techniques ahead of other techniques.
- In a Military population, CAM was most prescribed for anxiety and depression and for physical pain conditions.
- Approximately one third of U.S. Active Duty seamen and Marines used some form of CAM, primarily herbal therapy, massage, high-dose vitamins, and relaxation.

Congress has repeatedly mandated CAM therapies, integrative health and wellness treatment services for Military personnel and CAM research to advance the agenda.

CAM therapies have been applied to PTSD, TBI, and comorbidities in the Department of Defense; detailed information on this was provided.

The ten TATRC-funded CAM research projects involving TBI and PTSD treatments from the FY07 budget were presented. These involve the use of acupuncture, psychiatric dogs, virtual reality and cell phones, yoga, mindfulness treatment, and meditation on TBI and PTSD. A total of \$24 million has been spent on CAM-related research applications in PTSD and TBI treatment (2007 – 2011).

War stressors and co-morbid concerns in combat veterans were summarized. Summaries of total force fitness and health protection/treatment programs in the Military services and across domains (physical, spiritual, mental, social, etc.) were provided.

Dr. Money also summarized manipulative body-based practices such as multiple breathing control techniques, TRM, TRE, yoga, MMFT, MBSR, etc. Meditation was also described in detail, distinguishing concentration from mindfulness meditation techniques. Many techniques currently used or being explored in the U.S. DoD were summarized in detail.

### **C.2.8 Mindfulness Trainings and Watsu as a Rehabilitative Treatment for Deployment-Related Stress (CPT Frederick Zimmermann, MA)**

Mindfulness-based interventions are becoming increasingly popular in clinical and non-clinical settings. Civilian and Military policy-makers responsible for corporate health management and human resource development are more and more interested in mindfulness trainings as a useful tool to reduce stress and enhance cognitive performance, leadership and well-being. CPT Zimmermann concisely discussed the scope, efficacy and adequate applications of mindfulness trainings. Moreover a particular interest was paid to rehabilitative and preventive applications of mindfulness in a Military environment. He also discussed how mindfulness has been tested successfully as an applicable measure in the Military. However, it remains to be implemented in the clinical and the non-clinical, Military environment on behalf of the well-being of every Soldier. First steps could include

<sup>3</sup> Barnes, P.M., Powell-Grinerm E., McFann, K. and Nahin, R.L. *Adv Data*. 2004 May 27;(343):1-19.

basic training and leadership programs as well as pre-/post-deployment trainings. Targeted populations as educator of mindfulness include chaplains, clinical personnel, physiotherapists, clinical psychologists, psychiatrists and GPs. Finally, the development of a NATO-handbook for practical mindfulness training guidelines is recommended addressing the most important questions and fundamental aspects of a practice.

### C.2.9 TFF Matrix (CPT Frederick Zimmermann, MA)

CPT Frederick Zimmermann presented a proposal for an organizational structure for the committee. This was well-received by the group. A discussion point was on the proper labels for the dimensions, with suggestions to change “nutrition” to something like “individual health behaviors”.

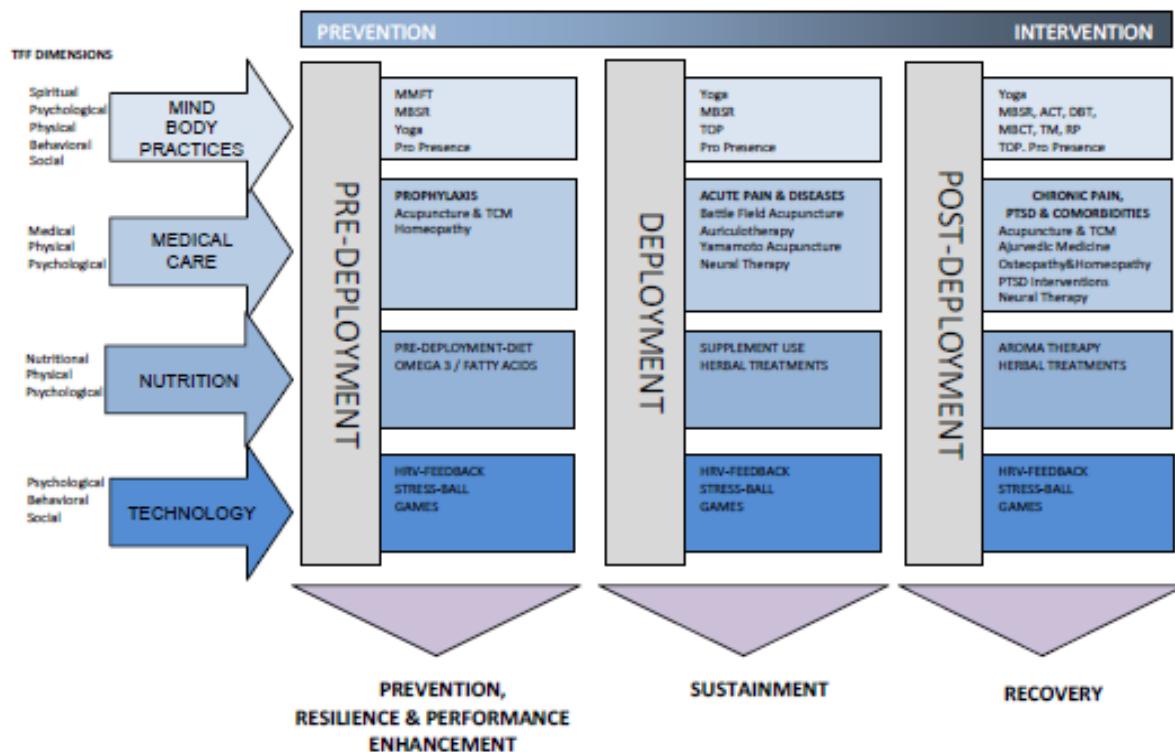


Figure C-1: Proposed Matrix for Integrative Medicine Treatments.

### C.3 SUMMARY OF DISCUSSION

The group discussed:

- Dr. Laurent Bezin led discussion of definitions of resilience and what wellness or well-being really means. There was considerable discussion about true integration of wellness strategies (vs. stove-piped discipline-based approaches), pulling together a recurrent theme of all of the presentations in this meeting.
- The organization of the report with chapters largely focused on comprehensive integrative models was narrowed to about 10 chapters with provisional author assignments. Refined versions of any of

these chapters should be strongly considered for submission to peer reviewed journals for critical appraisal and much higher visibility and sharing of the work products of the group; if possible, the acknowledgments should include a reference to the group such as “this paper prepared as part of the work product of NATO Research Technology Organization Task Group (RTG) 195, Integrative Medicine Interventions for Military Personnel.”

- The next meeting is scheduled for 8-10 October 2012 in Amsterdam.

Annex completed by HFM-195 Rapporteur, COL Karl Friedl.



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## Annex D – SUMMARY REPORT OF FOURTH MEETING, 8-10 OCTOBER 2012

**Theme: East West Integration and the Metrics  
of Integrative Medicine Interventions**

**Venue: Sino-Dutch Centre for Preventive and Personalized Medicine (SD PPM)  
(DICP – Chinese Academy of Sciences, University of Leiden and  
TNO Collaboration) Utrechtseweg 48, Zeist, Netherlands**

### D.1 PARTICIPANTS/PROGRAMME COMMITTEE

Member Nations	Attendees
France	Médecin en chef Marion Trousselard Captain Nathalie Babouraj Dr. Rafael Nogier (Absent) Dr. Laurent Bezin
Germany	Prof. Dr. Arndt Büsing CPT Frederick Zimmermann, MA
Hungary	Prof. Dr. Gabriella Hegyi (Absent)
Italy	Dr. Paolo Roberti di Sarsina (Absent)
Netherlands (Meeting Host)	Dr. Jan van der Greef (Meeting Chair)
United States	Dr. Jean Louis Belard (Chair) (Absent) Dr. Wayne Jonas (Absent) COL Richard Petri, Jr. (Rapporteur) Dr. Richard Niemtzow COL Karl Friedl (Absent)
Consultants and Guests	Dr. John Ives (United States) Dr. Jain Shamini (United States) Dr. Eduard van Wijk (Netherlands) Dr. Roeland van Wijk (Netherlands) Dr. Herman van Wietmarschen (Netherlands) Dr. Yan Schröen (Netherlands) Mr. Matthew Heineman (United States) Ms. Susan Froemke (United States)

### D.2 SUMMARY OF PRESENTATIONS

#### D.2.1 Meeting Host's Opening Comments, Introductions, and Initial Discussion (Dr. Jan van der Greef)

Dr. Jan van der Greef welcomed participants to the Fourth Meeting of the NATO Task Force on Integrative Medicine in Zeist. He stated that Dr. Belard, TF chairman, would not be able to attend this meeting and

therefore he would chair the meeting. Further, in the absence of COL Friedl, COL Petri would be the meeting's rapporteur. It was asked that all speakers provide a brief synopsis of their lectures for the NATO report.

The key focus of this meeting is the East and West integration as well as the metrics of integrative medicine interventions.

Key areas of discussion for this meeting are:

- Systems biology; and
- Concept and construct for the integration of “Eastern” with “Western” philosophies and treatments.

The follow on meetings are scheduled as follows:

22-24 April 2013 Cologne, Germany  
Fall 2013 France

## D.2.2 Bridging Western and Chinese Medicine via Systems Biology (Dr. Jan van der Greef)

Dr. van der Greef addressed in his presentation the importance of defining health as ability not as a state and outlined the systems approach to health and disease. Important aspects as homeostasis, allostasis and disease states were schematically discussed to come to systems biology-based measurement of resilience. The important aspect of personalized health/medicine in the research of the Sino-Dutch Centre for Preventive and Personalized Medicine (SD PPM), a collaboration of TNO, University of Leiden and the Chinese Academy of Sciences, was discussed. Merging Western- and Chinese-based diagnosis is the basis for integration and for applying a personalized approach in Western healthcare. Moreover to be able to measure impact on preventive strategies dynamic systems measurements needs to be performed to understand the self-organization aspects. It enables the paradigm switch to approach health care from the health promotion perspective instead of from the disease management perspective. The use of herbal medicine for a systems intervention was discussed underlining the synergetic nature of the components involved and an example was shown of the first Chinese Medicine product that was produced in China and that was registered under the new EU guidelines of tHMP. The product definition was based on quality of production (EU GMP) and scientific evidence for efficacy and safety. Finally the shift that occurs in Life Sciences was addressed and the role Chinese Medicine could play in the future of health care.

### D.2.3 Mascots in the Army (Médecin en chef Marion Trousselard)

For many Soldiers confronted with exposure to stressful situations, an animal-mascot bond is considered effective help for dealing with the stress. While most studies carried out on animals' needs concentrate on the care of civilian individuals, our focus was on determining the reliability of an instrument to measure emotional, rational and psychosocial needs of the Military engaged in numerous conflicts around the world; and to analyze its external validation. Methods: In an anonymous cross-sectional retrospective survey, we applied the Animal-Mascot Bond Questionnaire (AMBQ) associated with Coping Inventory Stressful Scale (CISS), Post-Traumatic Stress Disorder (PTSD) and Check List Scale (PCL-S) assessments to 168 Soldiers after their deployment in theatre. Results: Factor analyses of the 23-item construct (Cronbach's alpha = 0.962) pointed to a 3-factor solution, which revealed 77.03% of variance:

- 1) Animal-group bond;
- 2) Individual-animal emotional bond; and
- 3) Individual-animal rational bond.

All these factors were positively correlated with the emotional-centered coping style. Human-animal bonds were greater for Soldiers with the provisional diagnosis of PTSD. Limited responsibility was the strongest predictor for animal-mascot bonds. The PTSD status and emotional coping also predicted both individual animal bonds. Conclusions: The evaluation of the AMBS revealed that the instrument has good psychometric properties. Soldiers with less responsibility, PTSD and emotional-coping scored the highest on the AMBS suggesting that they expressed the highest needs for a bond with an animal-mascot. One may assume that the animal-mascot bonds will result in a therapeutic coping process for mitigating distress for Soldiers.

#### **D.2.4 Acupuncture in NATO (Dr. Richard Niemtzow)**

Dr. Niemtzow discussed the use of Battlefield Acupuncture (BFA) within the Military (Refer to Chapter 6 – Battlefield Acupuncture in the U.S. Military: A Pain Reduction Model for NATO). The neuroanatomy of pain processing and the rationale for the selection of the five BFA points was discussed. Dr. Niemtzow reviewed numerous studies of BFA and pain syndromes. He described the work done by Dr. Cho, Neuroscience Research Institute, Incheon, Korea on cortical activation studies. It illustrated the decreased cingulated cortex activation using acupuncture in pain-stimulated subjects. Examples of anterior cingulated cortex, frontal and posterior parietal lobes changes with acupuncture treatments in pain induced (left finger) subjects utilizing fMRI were reviewed. Dr. Niemtzow described a study of the effect of BFA on oxygen changes in the CNS. The study showed a change in regional oxyhemoglobin ( $O_2Hb$ ) and deoxyhemoglobin (HHb) in brain tissues of the frontal area in the 50-channel recordings. A study of auricular acupuncture in the treatment of acute pain syndromes performed at a U.S. Military hospital ER showed 23% reduction in the pain level (NRS) during the ER visits compared to a standard medical group (control). Both groups had similar pain reduction at 24 hours after ER visit. In the study performed by Spira, acupuncture was briefly discussed<sup>1</sup>. It is a descriptive report of acupuncture use in a deployed theater during Iraqi Freedom (Summer 2006). Conditions that were evaluated included back, neck, hip, pelvis, shoulder or elbow conditions due to injuries (92%) and illnesses (8%). The study showed that acupuncture hastened the return to duty rate by an average of 2 days for all injuries and 82% of subjects with some to significant improvement. Only 17% of the subjects stated there was no improvement with the acupuncture treatment. A cost analysis showed that weekly costs for acupuncture was \$1.82 whereas NSAID was \$10 – 20 (Ibuprofen \$10.08, Celecoxib \$20.58). An observational study conducted at an acupuncture clinic at a U.S. Military hospital, acupuncture was demonstrated to have significant improvements in the mental and physical sub-scales of the SF-8 quality of life metric at 4 weeks following the first acupuncture treatment. Finally, data from the USAF acupuncture program (Helms Medical Institute) from 2009 showed that acupuncture (auricular, PENS and Chinese scalp) has significant operational impact on pain conditions. The data were compiled by Dr. Arnyce Pock.

#### **D.2.5 Principles of Ayurveda (Captain Nathalie Babouraj)**

Capt. Babouraj discussed the general philosophy of one of the most ancient healing systems of the Eastern world; Ayurvedic medicine. She discussed the core concepts of Ayurveda and proposed it as a global health approach. Ayurveda is based on the interdependence of man with nature and the dynamic forces that determine health and disease. Although Ayurveda has been practiced since approximately 1500 BC, several key principles can be integrated into our “modern” medical practice to improve diagnostic tools, treatment axis as well as preventive approaches. The question was raised on the method to evaluate a combination of integrative medicine modalities. A clinical case illustrated that “identical” back pain is not always identical when viewed utilizing different system overlays (conventional, i.e., diagnosis of back pain and Ayurveda, i.e., difference with body and pain type air vs. fire). In fact one treatment for a conventional diagnosis may actually worsen the condition when evaluated using another systems approach. Ayurvedic profiles and the differences these profiles can make

<sup>1</sup> Acupuncture: a useful tool for health care in an operational medicine environment”, Mil Med, 173,7:629,2008.

toward approaches in healthcare were introduced. The concept of the mind/body technique known as Powernap was briefly discussed.

#### **D.2.6 Mindfulness and Spiritual Needs (Prof. Dr. Arndt Büsing)**

Dr. Büsing discussed a general overview of Spirituality and Religiosity (SpR) and health. SpR can improve long-term adjustment to chronic disease or trauma through a range of effects ranging from “life has meaning” to emotional comfort to compassion for others. Mind/body medicine describes the interplay and interaction between the mind, emotion, vitalities and physis. Physis (Greek: φύσις) is a Greek **theological, philosophical, and scientific** term usually translated into English as “**nature**”. Descriptive of the differentiation of specific beliefs (cognition/emotion) and practices (action) was presented. Religious orientation, transcendence conviction and quest orientation increase with age whereas conscious interactions, compassion/generosity and aspiring beauty/insight were noted to be expressed at high levels in adolescents from a study by Dr. D. Büsing. Increasing research showed a connection between SpR and physical and psychological health with better coping capabilities. Additionally, positive emotions and growth follow trauma when survivors rely on SpR beliefs for coping. Dr. Büsing described a study he conducted on the spirituality and the meaning of illness<sup>2</sup>. He postulated whether positive appraisal lead to transformational growth in SpR individuals. He further described studies on intrinsic religiosity/spiritual well-being and Quality of Life (QoL), the benefit of SpR, if indeed there is one, in a secular society. Based on research with German cancer patients, patients want their doctors to be interested in their spiritual orientation. Therefore, Dr. Büsing presented a conceptual framework of spiritual needs related to the ERG model. ERG refers to existence (safety), relatedness and growth. Spiritual needs could be regarded as patient’s longing for psycho-spiritual well-being, which should be supported by health care professionals as an independent resource of relevance. Thus the questions was raised, how can we offer spiritual support when in secular societies there is up to 50% of patient with chronic disease who regard themselves as R-S- (neither religious, nor spiritual)? Dr. Büsing described the research project “Beneficial Resources and Unmet Psychosocial and Spiritual Needs of Military Personnel. This is an ongoing joint project between the Germany and France Military.

#### **D.2.7 Biophotonics as a Diagnostic Tool in Health and Disease (Dr. Eduard van Wijk / Dr. Roeland van Wijk)**

Bioluminescence is the process of production and emission of light by a living organism via chemiluminescence-based processes. In fact, all cells produce some form of light emission, but most of this light is not visible to the unaided human eye. This photonic emission has characteristic wavelengths, duration, timing and patterns of flashes. These are features often associated with information and, while not proof in and of itself, it is reasonable to assume that these light emissions contain and carry information about the biological systems that produced it.

#### **D.2.8 Integration of Chinese and Western Medicine – A Key Role for Systems Diagnosis (Dr. Herman van Wietmarschen / Dr. Yan Schröen)**

Chinese and Western medicine have evolved in different cultural settings throughout history and have led to two different ways of conducting science and medicine. Western medicine is currently facing the challenge of rapidly rising costs and decreasing new effective drugs. The future lies in personalized medicine, which can be developed by the integration of Chinese and Western medicine. The Sino-Dutch Centre for Personalized and Preventive Medicine (SD PPM) aims for this integration. A systems biology approach is used to capture Chinese

<sup>2</sup> Büsing, A., Michalsen, A., Balzat, H.-J., Grünter, R.A., Ostermann, T., Neugebauer, E.A.M. and Mathiessen, P.F. Are spirituality and religiosity resources for patients with chronic pain conditions? Pain Med. 2009 Nov;10(8):1501-2.

and Western types of patient information. Rheumatoid arthritis and pre-diabetes are taken as examples to show how a systems biology approach together with Chinese symptom profiles has resulted in finding relevant sub-types of patients and understanding the biology of these sub-types. Drs. van Wietmarschen and Schröen described two studies of Cold and Heat sub-types of rheumatoid arthritis patients, which were extensively, characterized using a Chinese symptom questionnaire, a Chinese diagnosis, metabolomics and clinical chemistry measurements. PLS-DA and PCA were used to discover differences between the sub-groups. The relationships between the symptoms and Chinese concepts were visualized and the biology behind the sub-groups was discovered. Another study focused on discovering metabolite differences between two sub-types of pre-diabetes patients. The findings of the studies were that the two sets of symptoms were found to be closely related to either the RA Cold or the RA Heat group of patients. Apoptosis regulation was found to be differently regulated in RA Cold and RA Heat patients. A number of acylcarnitine levels in urine were found to be lower in Cold RA than in Heat RA patients. Metabolomics analysis resulted in a model that was able to classify 85% of the patients correctly into the Cold or Heat RA group. Urine metabolite differences were found between two sub-types of pre-diabetes patients. Rehmannia 6 (R6) formula was found to reduce Yin deficiency symptoms first and subsequently relieve Qi deficiency symptoms. Differences in plasma metabolite changes during treatment were found for patients treated with R6 and a modified R6 formula. The research shows that systems diagnosis methods are useful to characterize sub-groups of RA and pre-diabetes patients and increase biological knowledge of Chinese diagnostic concepts. Treatment strategies can then be optimized for these sub-types of patients. Increasing understanding of Chinese diagnosis is necessary to target Chinese herbal medicine to the right sub-groups of patients. Translation of work in RA and DM to pain conditions may help to explain differences in treatment outcomes with “standardized” treatment for “Western” diagnosis.

#### **D.2.9 Resilience, Allostasis and Health – Development of a Systems Model (Dr. Jain Shamini)**

This presentation provided an overview of the current state of the science surrounding the study of resilience, and proposed a preliminary framework aimed at tracking resilience from a systems-based perspective. The relationship of the proposed resilience model to allostasis and health was discussed, particularly within the context of Military health and wellness. There is a great need for systems-based bioinformatics tools that will help examine and evaluate treatment services for enhancing resilience. Resilience is revealed when an individual is faced with a stressor and succeeds in thriving or maintaining optimal functioning despite these challenges. This is related to the concept of allostasis, a dynamic process that serves not as “bouncing back” to maintain homeostasis after a stressor, but rather a process that promotes “evolving forward” to promote healthy functioning within specific stressor contexts. While resilience continues to be examined and described within specific scientific disciplines such as psychology or biology, these efforts are generally examined “piecemeal” without an examination nor integration of the various inputs and domains that work together to confer enhanced resilience. The Samueli Institute’s DoD-funded project, “Central Evaluation of Resilience Programs” which aims to create a systems-based model for understanding and tracking resilience was described. The model includes inputs from systems biology, psychoneuroendocrinology, systems neuroscience, psychology and behavioral science, and consciousness and spirituality.

#### **D.2.10 Documentary *Escape Fire: The Fight to Rescue American Healthcare* (Mr. Matthew Heineman / Ms. Susan Froemke, Directors)**

The documentary *Escape Fire: The Fight to Rescue American Healthcare* was presented.<sup>3</sup> The synopsis of the film is as follows:

<sup>3</sup> [http://escapemovie.com/pdf/EscapeFire\\_PressKit.pdf](http://escapemovie.com/pdf/EscapeFire_PressKit.pdf).

*Escape Fire: The Fight to Rescue American Healthcare* tackles one of the most pressing issues of our time: how can we save our badly broken healthcare system? American healthcare costs are rising so rapidly that they could reach \$4.2 trillion annually, roughly 20% of our gross domestic product, within ten years. We spend \$300 billion a year on pharmaceutical drugs – almost as much as the rest of the world combined. We pay more, yet our health outcomes are worse. About 65% of Americans are overweight and almost 75% of healthcare spending goes to preventable diseases that are the major causes of disability and death in our society. It's not surprising that healthcare is at the top of many Americans' concerns and at the center of an intense political firestorm in our Nation's Capital. But the current battle over cost and access does not ultimately address the root of the problem: we have a disease-care system, not a healthcare system. The film examines the powerful forces maintaining the status quo, a medical industry designed for quick fixes rather than prevention, for profit-driven care rather than patient-driven care. *ESCAPE FIRE* also presents attainable solutions. After decades of resistance, a movement to bring innovative high-touch, low-cost methods of prevention and healing into our high-tech, costly system is finally gaining ground. Filmmakers Matthew Heineman and Susan Froemke interweave dramatic personal arcs of patients and physicians with the stories of leaders battling to transform healthcare at the highest levels of medicine, industry, government, and even the U.S. Military. *Escape Fire* is about finding a way out of our current crisis. It's about saving the health of a nation.

### D.3 SUMMARY OF DISCUSSION

The group discussed:

- A question of the format for the remaining two meetings was discussed. Is it best to have continued lectures on meeting topics or is it more efficient to have working meeting to develop the chapter and NATO reports? Consensus was that:
  - Individuals with interests in identified chapters or new chapters need to inform Dr. Belard by year end (December 2012);
  - A more definitive structure to the reports will be developed and approval via email networking;
  - Chapter team leaders will be identified; and
  - Status reports on each chapter will be presented at the next meeting in April 2013 in Cologne, Germany.
- Following the lectures given during this meeting, it was agreed that the current matrix could be improved to incorporate systems approaches with whole system (holism) view.
- Suggested format for each chapter should follow the scientific journal format (title, author, abstract, key words, introduction, material/methods, results, discussion, conclusion, references).
- At the request of the participants the idea of project development should be discussed at the next meeting. Collaborative, multi-national projects will serve as good outcomes for this Task Force as well as assist to anchor further projects and or meeting opportunities.
- The next meeting is scheduled for 22-24 April 2013 in Cologne, Germany. Host will CPT Frederick Zimmermann, MA.

Annex completed by HFM-195 Rapporteur, COL Richard Petri, Jr., MC.

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## Annex E – SUMMARY REPORT OF FIFTH MEETING, 22-24 APRIL 2013

**Theme: Integrative Medicine as a Tool to Enhance Performance and Wellness**

**Venue: Germany Air Force Facility, Cologne, Germany**

### E.1 PARTICIPANTS/PROGRAMME COMMITTEE

Member Nations	Attendees
France	Médecin en chef Marion Trousselard Captain Nathalie Babouraj Dr. Rafael Nogier (Absent) Dr. Laurent Bezin
Germany (Meeting Host)	Prof. Dr. Arndt Büssing CPT Frederick Zimmermann, MA (Meeting Chair)
Hungary	Prof. Dr. Gabriella Hegyi (Absent)
Italy	Dr. Paolo Roberti di Sarsina (Absent)
Netherlands	Dr. Jan van der Greef
United States	Dr. Jean Louis Belard (Chair) (Absent) Dr. Wayne Jonas (Absent) COL Richard Petri, Jr. (Rapporteur) Dr. Richard Niemtzow (Absent) COL Karl Friedl (Absent)
Consultants and Guests	Dr. Karl Kubowitsch (Germany) Dr. Niko Kohls (Germany) Dr. Sabine Schöenfeld (Germany) Dr. Peter Kruit (Germany) Dr. Herman van Wietmarschen (Netherlands) Dr. Yan Schröen (Netherlands)
NATO	COL Peter Mees

### E.2 SUMMARY OF PRESENTATIONS

#### E.2.1 Chairman's Opening Comments, Introductions, and Initial Discussion (CPT Frederick Zimmermann, MA)

Frederick Zimmermann reviewed the membership (see “Programme Committee”) and made introductions. He went over the agenda and presented general logistic housekeeping items. CPT Zimmermann emphasized several key objectives for this meeting:

- Confirmation of chapter authors and leads; and
- Defined time for groups to work on chapter on the afternoon of the second day.

COL Peter Mees, German Air Force spoke to the group. COL Peter is a member of another NATO Task Force and spoke about a recent meeting. It was requested for a program in Battlefield Acupuncture to be funded and implemented within NATO Forces. However, NATO will not support any CAM treatments until there is a report that details and supports CAM usage. Many countries are waiting for the report of the STO-TR-HFM-195 as that evidence. There exist the possibility for symposia and lecture series after the report.

#### **E.2.2 Usage of a Basic Breathing Meditation Technique to Attenuate Perioperative Stress (Prof. Dr. Arndt Büssing)**

Basic breathing meditation can be used to cope with acute stressors. Presented is its application to attenuate perioperative psychological stress in cancer patients. This breathing meditation does not require extensive training and can be supplemented with self-chosen affirmations which may help to focus on the breathing process and to assure hope and confidence, and thus decreasing distress and increasing positive mood states. Findings from a pilot study with 21 cancer patients showed that most have used the mediation technique prior to surgery (11 often, 3 very often, 5 rarely, and 2 not), and that it was beneficial to attenuate their perioperative stress (stated ‘very helpful’ in 9 patients, ‘somewhat helpful’ in 8, and ‘not helpful’ in 3 patients). This self-administered, low threshold breathing meditation technique can be used whenever the patient feels anxious or stressed.

#### **E.2.3 Enhancing Performance and Health: Bio-Neurofeedback as an Integrative Approach for Assessment and Training (Dr. Karl Kubowitsch)**

Bio-Neurofeedback is a scientific sound approach with rich empirical evidence in the fields of performance, prevention and intervention. It is embedded in a theoretical framework (neurosciences and applied psychophysiology). For the purposes of assessment, training and interventions, fields of application for Military personnel are introduced (e.g., integration of self-regulation techniques in Military training and exercises; qualification programs for Military psychologists; promoting mental health/resilience programs). Additionally, contributions for human factors in the Military field are highlighted.

Current projects and programs in the German Air Force were briefly outlined. Practical examples and case studies with measurement data illustrated how this approach verifiably contributes to the improvement of fitness and performance. Practical applications of Bio-Neurofeedback for pilot selection and training are focused, as well as pre-deployment CSI training and exercises for aircraft crews (combat, survival, resistance to interrogation).

#### **E.2.4 Harnessing the Placebo Effect for Health Promotion and Resilience (Dr. Niko Kohls)**

Empirical findings have identified placebo effects as psychophysiological phenomena serving as a potential health resource. Whereas older research has interpreted such effects with psychological mechanisms, newer conceptualizations propose that placebo effects engage neural “top-down” processes that are involved in health-related effects. It is therefore reasonable to interpret placebo effects as the body’s innate capacity to heal itself. Empirical evidence suggest that mind/body practices such as mindfulness meditation or yoga may actually engage similar mechanisms that can be used for building salutogenetic potential. In this way, this paradigm of interpreting placebo expresses our most current understanding of the physiological, psychological and socio-cultural aspects of these effects, and may also increase the likelihood of eliciting self-healing processes both in clinical and non-clinical contexts.

### **E.2.5 Efficiency of Tactic to Optimize the Potential (TOP) and Cardiac Coherence on Professional Stress (Médecin en chef Marion Trousselard)**

The effectiveness of two stress management programs based on cognitive or emotional intervention in stress perception and stress reactivity in healthy workers with operational stress were discussed. The study consisted of 180 young fire-fighters recruits that were randomly assigned to a controlled intervention trial into three groups:

- A cognitive stress program (Tactics to Optimize the Potential – TOP) group;
- An emotional biofeedback stress program (Heart Coherence – HC) group; or
- A control group.

A placebo was given as a nutriceutical for each of the three groups during the time of the training. The stress programs training lasted eight weeks, with one hour training per week. The primary outcome variables included the perceived stress and the second outcome variables included stress reactivity (mindfulness, negative mood, Immunoglobulin A). Post-intervention effectiveness, long-term benefits as influence of the anxiety on the programs' benefits was evaluated.

The results of the study showed that both TOP and HC stress programs reduced operational stress in healthy workers by improving stress perception, stress reactivity and immunity. Long-term effects were recorded. Anxiety influenced the benefits of the treatment and highlighted a placebo response to stress.

Therefore, it is suggested that short stress program interventions improved stress perception and stress reactivity in healthy workers. Organizations should be more concerned about strategy of management of working stress.

For detailed description, refer to Chapter 9 – Tactics to Optimize the Potential (TOP) and Cardiobiofeedback (CBF) in Stress Management: The French Experience.

### **E.2.6 Benefits and Neurophysiological Mechanisms of Mindfulness and Training (CPT Frederick Zimmermann, MA)**

Description of the benefits and neurophysiological mechanisms of mindfulness. The practice of Mindfulness can be used as either a treatment or prevention. The cognitive and behavioral effects of mindfulness include:

- 1) Better allocation of attentional resources;
- 2) Enhanced working memory capacity;
- 3) Improved emotional regulation;
- 4) Empathy;
- 5) Reduced startle response;
- 6) Decreased need for sleep;
- 7) More detached sense of self-including metacognitive processes; and
- 8) Increase cognitive vitality and protection against age-related cortical thinning.

EEG has shown a right to left shift with meditation; however, this is inconsistent with fMRI findings. Brain activity patterns correspond consistently with meditation style. The predominate areas of the brain that are activated with meditation include the Dorsolateral Prefrontal Cortex (DLPFC), Anterior Cingulate Cortex (ACC) and Insulate. The DLPFC is the area of the brain involved in executive functions such as working memory, cognitive flexibility, planning, inhibitions and abstract reasoning. The ACC is the area of the brain involved in

rational cognitive functions such as reward anticipation, decision-making, empathy, impulse control and emotions. And finally, the insula has a role in the autonomic functions such as regulation of blood pressure and heart rate. Additionally the insula is involved in consciousness and functions related to emotions. Further, studies have shown there is increased telomerase activity with implications for telomere length and immune cell longevity with meditative practice.

#### **E.2.7 From the Lab to the Therapy Room – Process-Oriented and Evidence-Based Standard Methods in the Treatment of PTSD (Dr. Sabine Schönenfeld)**

Aim of the presentation was to point out the benefits and limits of evidence-based standard treatments for PTSD, by presenting state-of-the-art/commonly used interventions AND their empirical support, both for single traumatization and chronic traumatization. Three interventions were looked at more closely:

- 1) An effective treatment where mechanisms are partly not understood (exposure therapy, Foa);
- 2) An effective treatment, based on basic research and empirical support (Cognitive Behavior Therapy, CBT by Ehlers & Clark); and
- 3) A very popular and widely used (in Germany) but not empirically supported treatment (Psychodynamisch Imaginative Traumatherapie – PITT, Reddemann).

The CBT intervention by Ehlers & Clark was used as a step-by-step example for translational research.

#### **E.2.8 Whole Systems Resiliency Assessment – Health, Resilience and Dynamic Modelling (Dr. Jan van der Greef / Dr. Herman van Wietmarschen / Dr. Yan Schröen)**

Various cultures across the globe have given rise to a variety of sciences resulting in different medical practices. Each of these medical systems makes use of particular concepts of health, wellness, resilience and healing. In Western medicine ‘health’ is currently redefined as the ability to adapt and self-manage in the face of social, physical and emotional challenges. In Chinese and Indian medicine the concept of health is more related to being one with nature and the rhythms of life. An integration of medical systems is needed to fully take advantage of the various viewpoints and enlarge understanding of resilience, wellness, health and the means to promote health and resilience.

Western and Asian medicine apply very different methods for assessing health. Western science is very good at measuring molecules and has generally followed a bottom up approach with regard to ‘the pyramid of life’ as described by Oltvai et al. Elucidating higher levels of system organization has proven to be difficult. Knowledge of health and maintaining health is very limited compared to the knowledge that is gained about the molecular basis of diseases. Asian medicine systems on contrary have evolved as top down approaches, phenomenological approaches based on the organization and dynamics of symptom patterns. Recently, significant steps have been taken to develop what is called a ‘middle out’ approach towards the integration of measurements of these diverse levels of system organization.

In this presentation, various cultures of medicine were briefly described. Then, approaches for the scientific evaluation and integration of various systems of medicine were discussed, illustrated with some examples from recent scientific literature.

#### **E.2.9 Historical Findings in PTSD Research (Dr. Peter Kruit)**

Description of the Netherlands participation in WWII and the medical casualty system used to document wounded Soldiers.

### **E.3 SUMMARY OF DISCUSSION**

The group discussed:

- Rough outline for the report and suggested chapters. Most chapters have been assigned with lead authors identified (see Appendix E1).
  - Chapter length guideline of 10 pages maximum.
  - The chapters need to be concise with tables and figures to be used liberally.
  - Extra materials related to the chapter can be placed in the appendices.
  - Chapters organized in 1 – 3 per phase of pre- during and post-deployment. The chapter's framework could be based on the Total Force Fitness adapted matrix presented by CPT Zimmermann at meeting 3.
  - Overall structure of the report should focus on a cohesive program of modalities in a holistic program, e.g., the U.S. Interdisciplinary Pain Management Center (IPMC) initiative.
  - Vignettes of Soldiers stories could be included in the report as stand-alone boxes.
  - Agreed upon time line as follows:
    - 1 May 2013 Agreement on chapter leads and authorships.
    - 1 June 2013 Abstract of 250 words.
    - 15 August 2013 First draft.
    - 1 September 2013 Final draft.
    - 8 September 2013 HFM-195 Draft report to group.
  - Suggested framework for the chapters:
    - Brief introduction of the topic with definition(s).
    - Description of the field with scientific findings.
    - Concrete applications.
    - Recommendations including contribution of modality into a holistic program, including preventive approaches.
    - Multi-dimensions of man (physical, emotional, mental/psychological, cognitive, spiritual, creative).
    - Connectivity to the larger, e.g., cell to universe nodal systems theory.
    - Integrative Health and Healing (IH2) Concepts (Community-wide Involvement and Everyday Personal Practices) as part of every chapter.
    - Annex.
    - Bibliography.
    - Glossary.
  - Task Force consensus on definitions.
  - The next meeting is scheduled for October 2013 in Washington, DC, USA, or Paris, France. Agenda to be the discussion of Clinical pathway of conditions such as pain, psychological issues, e.g., Royal London Hospital for IM framework as well as the discussion of the final chapter.

Annex completed by HFM-195 Rapporteur, COL Richard Petri, Jr., MC.

## **Appendix E1**

Chapter 1 – Overview of Integrative Wellness/CAM Practices and Policies in NATO Participant Nations. (Sarsina, Heygi, Jonas, Belard, van der Greef, Babouraj).

Chapter 2 – Acupuncture and Potential Applications for Military Medical Pain Management. (Bart-Knauer, Niemtzow, Nogier, Petri).

Chapter 3 – Mind/Body Principles/Practices with Sub-Sections in Yoga, Mindfulness and Spirituality. (Zimmermann, Babouraj, Trousselard, Büssing).

Chapter 4 – Current Research on Practices Not Generally Accepted in NATO Medicine – Energy Medicine, Homeopathy, Hyperbaric Oxygen Therapy. (Niemtzow, Hegyi, Belard).

Chapter 5 – Biologically-Based Practices that Could be Incorporated into Rations and Over-the-Counter Supplements to Optimize Soldier Resilience, Performance, and Wellness. (Bart-Knauer, Belard, Jonas, Hegyi, Friedl).

Chapter 6 – Trauma Spectrum Response. (Jonas, Petri, Bezin).

Chapter 7 – Holistic Strategies such as Ayurvedic Medicine. (Babouraj).

Chapter 8 – Integrative Medicine Practices Specifically for the Deploying Soldier. (Petri).

Chapter 9 – Systematic Approaches to Evaluation and Integration of Eastern and Western Medical Practices. (van Wietmarschen, Schöen, Babouraj).

Chapter 10 – Conclusions and Recommendations – Integrative Medicine and the Multi-Dimensional Approaches in the Context of Multi-Health Systems Diagnoses and Tailored Treatment Programs. (All).

## Annex F – SUMMARY REPORT OF SIXTH MEETING, 30 APRIL – 2 MAY 2014

**Theme: The NATO Report Working Meeting**

**Venue: Radisson Airport Hotel, El Paso, TX, USA**

### F.1 PARTICIPANTS/PROGRAMME COMMITTEE

Member Nations	Attendees
France	Médecin en chef Marion Trousselard Captain Nathalie Babouraj (Absent) Dr. Rafael Nogier (Absent) Dr. Laurent Bezin (Absent)
Germany (Meeting Host)	Prof. Dr. Arndt Büssing (Absent) CPT Frederick Zimmermann, MA
Hungary	Prof. Dr. Gabriella Hegyi (Absent)
Italy	Dr. Paolo Roberti di Sarsina (Absent)
Netherlands	Dr. Jan van der Greef (Absent)
United States	Dr. Jean Louis Belard (Absent) Dr. Wayne Jonas (Absent) COL Richard Petri, Jr. (Chair) (Rapporteur) Dr. Richard Niemtzow COL Karl Friedl (Absent)

### F.2 SUMMARY OF PRESENTATIONS

#### F.2.1 Chairman's Opening Comments, Introductions, and Initial Discussion (COL Richard Petri, Jr.)

COL Petri welcomed the task force members to El Paso, TX, USA. The agenda for the meeting was to develop the outline of the NATO report and recommendations for Integrative Health and Healing for NATO.

#### F.2.2 Areas of Interest for Report (Group)

Germany – Stress management.

France – Stress management.

USA – Pain management and prevention, Stress management, Suicide prevention.

#### F.2.3 Executive Summary (Group)

Discuss the financial impact of CAM implementation in relationship to delayed onset of disease.

Acute prevention vs. chronic management.

Budget constraint dictates the need for cost saving modalities.

#### **F.2.4 Recommendations (Group)**

- Develop professionals (e.g., trainers, educators) in the individual's area of interest related to Integrative Health and Healing (IH2) modalities. Understand that 30% of patients do not practice after being taught, 30% practice with a teacher and 30% perform self-practice.
- Recognize the importance of Integrative Medicine (IH2) modalities and the impact on the Military and the required support to include appropriate and necessary funding.
- Understand that IH2 modalities represent a shift in Military practices in fitness, e.g., Service Members (SMs) would rather run than perform yoga.
- Develop the best clinical practices for the NATO participants Militaries.

#### **F.2.5 Questions (Can be Answered on a Collective/Organizational and/or Individual Level) (Group)**

- 1) Why can Integrative Medicine (IM) be implemented into the Military?
- 2) How much will it cost to implement?
- 3) Will it save the Military any money at any point?
- 4) How will IM affect the organization and the individual?
- 5) Can IM be tailored to the Military constraints?
- 6) Are there any other partners that can fund the implementation? International vs. national?
- 7) What are the broader economical contexts to family, society?
- 8) Can these contexts be used to leverage civilian partnerships?
- 9) Does the proposed program pass the FAST test = Feasible, Acceptable, Sustainable and Timely for the individual/organization?
- 10) Can the IM modalities be translated into an active exercise, i.e., passive vs active participation?
- 11) What is the role of IM in developing the “new normal” for injured Service Members (SMs)?
- 12) Will individual/leadership’s consciousness be changed by the implementation of IM into the Service?
- 13) How can any bias (leadership/practitioners/advocates) be minimized to allow for the best practices to be implemented? (at the policy level)

- 14) Can IM affect an individual's/leader's ability to make decisions, cognitive performance, ethical behaviors, or self-regulation?
- 15) How does IM fit into the currently healthcare systems, e.g., pharmacological interventions, surgical procedures?
- 16) Are there any adverse effects of implementing IM into the Military?
- 17) Could IM change the existing culture and identity of the Military? And if so, would this be a benefit or detriment to the organization or individual?
- 18) Can IM alter addiction and suicide rates?
- 19) Can cultural differences and experiences between countries help to treat difficult cases of a country?
- 20) Could overlapping systems, e.g., Traditional Chinese Medicine (TCM) and “Western” approaches, help to explain condition treatment failures?
- 21) Could personalized medicine help or harm the current system?
- 22) Can the Military organizations wait the necessary time to fully understand the benefits of the IM paradigm?

#### **F.2.6 Proposed Quick Wins of the Task Force and Impact on Military (Group)**

- 1) Discuss financial gains of presently used modalities within the Military (may need to use civilian data)- check articles on the NATO website (keywords – economic impact, IM, decreased absentee, sick days, return to work rates) – Data suggest that IM reduces sick days, absenteeism/presenteeism rate, improves performances, quality of life, however, there are few Military studies on cost-effective (collective benefits, e.g., unit cohesiveness/cohesion readiness, resiliency, overall unit performance vs. individual benefits, e.g., improved sense of well-being, quality of life, social impact surrounding individual, i.e., family).
- 2) Develop a core of professionals in each of the CAM areas of interest, i.e., identify the SMEs (Subject-Matter Experts) and train the trainer programs.
- 3) Understand the need to address/change the perception/education of the end user/policy-makers of the benefits of the shift in practice, i.e., there is a need to make these practices as a part of everyday life instead of an additional practice.
- 4) Discuss the quick win modalities for implementation such as mindfulness, movement, Battlefield Acupuncture (BFA) and biofeedback.
- 5) Understand the need to adapt IM modalities to the Military, e.g., yoga infused into Military sport.
- 6) Leverage improved performance as a significant benefit for the utilization of the modalities into Militaries.
- 7) Education end users/policy-makers that sometimes the mechanism of how IM works is less important than the effect of IM especially in modalities that are generally safe, but lack significant research and evidence at this point.

### **F.2.7 Proposed Long-Term Gains of Additional Related Task Forces (Group)**

These are outside the time range of this current Task Group. This would require extension of HFM-195 or new Task Forces to address these issues.

- F2.7.1 – Develop international collaborations in research, clinical practices, cultural differences.
- F2.7.2 – Understand the uniqueness of each Military and tailor modalities to those populations.
- F2.7.3 – Develop handbook/cheat sheets/guides for the Service Members, leadership.
- F2.7.4 – Develop TF on implementation of recommendations.
- F2.7.5 – Develop collaborations with other international organizations (NIH).
- F2.7.6 – Perform cost-effectiveness research on IM within the militaries.

### **F.2.8 NATO Reports (Group)**

The following could serve as models for the development of this report.

**Impact of Lifestyle and Health Status on Military Fitness** – RTO-TR-HFM-178.

**Stress and Psychological Support in Modern Military Operations** – RTO-TR-HFM-081.

### **F.2.9 Proposed Medical Acupuncture Journal and NATO Report with Lead Authors (Group)**

Preface/Editorial (Niemtzow).

Executive Summary (Petri).

Chapter 1 – Integrative Medicine as the New Healthcare Paradigm within the Military (Petri).

Chapter 2 – Overview of Integrative Wellness/CAM Practices and Policies in NATO Participant Nations (Heygi).

Chapter 3 – Integrative Medicine (IM) Experience in the United States Department of Defense (Petri).

Chapter 4 – Acupuncture and Potential Applications for Military Medical Pain Management (Niemtzow).

Chapter 5 – Mindfulness Practices as a Resource for Health and Well-Being (Zimmermann).

Chapter 6 – Yoga (Babouraj).

Chapter 7 – Spirituality (Bussing).

Chapter 8 – Biofeedback in Stress Management: The France Experience (Trousselard).

Chapter 9 – Biological-Based Practices for PTSD, Pain and Optimal Soldier Resilience (Friedl).

Chapter 10 – Trauma Spectrum Disorder and Integrative Medicine (Jonas).

Chapter 11 – Integrative Medicine Practices Specifically for Soldiers (Petri).

Chapter 12 – Systematic Approaches to Evaluation and Integration of Eastern and Western Medical Practices (van der Greef).

Chapter 13 – Discussion, Conclusion and Recommendations (Petri).

#### **F.2.10 Format for Medicine Acupuncture (Dr. Richard Niemtzow)**

Title

Abstract

Keywords

Introduction/Definitions

Main body / Sub-sections

Discussion

Conclusion / Recommendations / Financial Implications

### **F.3 SUMMARY OF DISCUSSION**

- This is the final formal meeting of Task Force HFM-195 Integrative Medicine Interventions for Military Personnel.
- Overall the group set the foundation for the final report.
- The possible next steps for this task force and the possibility for follow-on Task Forces were discussed.

Draft Annex completed by the HFM-195 Rapporteur, COL Richard Petri, Jr., MC.



REPORT DOCUMENTATION PAGE																					
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6. Title	Integrative Medicine Interventions for Military Personnel																				
7. Presented at/Sponsored by	<p>This Report documents the findings of Task Group 195, which investigated the current status of Complementary and Alternative Medicine (CAM) in NATO Nations focusing on the utilization and acceptability for Military personnel. Various modalities are described in detail as possible treatments for conditions such as pain, stress and for improved quality of life and resiliency.</p>																				
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13. Keywords/Descriptors	<table> <tbody> <tr> <td>Acupuncture</td> <td>Integrative medicine</td> <td>Religiosity</td> </tr> <tr> <td>Alternative medicine</td> <td>Meditation/mindfulness</td> <td>Self-care</td> </tr> <tr> <td>Battlefield Acupuncture (BFA)</td> <td>Military</td> <td>Spirituality</td> </tr> <tr> <td>Complementary and alternative medicine</td> <td>Pain</td> <td>Systems biology</td> </tr> <tr> <td>Integrative Health and Healing (IH2)</td> <td>Patient centered care</td> <td>Traditional Chinese medicine</td> </tr> <tr> <td></td> <td>Post-traumatic stress disorder</td> <td>Trauma spectrum response</td> </tr> </tbody> </table>			Acupuncture	Integrative medicine	Religiosity	Alternative medicine	Meditation/mindfulness	Self-care	Battlefield Acupuncture (BFA)	Military	Spirituality	Complementary and alternative medicine	Pain	Systems biology	Integrative Health and Healing (IH2)	Patient centered care	Traditional Chinese medicine		Post-traumatic stress disorder	Trauma spectrum response
Acupuncture	Integrative medicine	Religiosity																			
Alternative medicine	Meditation/mindfulness	Self-care																			
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	Post-traumatic stress disorder	Trauma spectrum response																			
14. Abstract	<p>The health of a force is crucial to its Military readiness. Decreasing Military budgets, global economic stagnation, and increasing medical healthcare cost threaten the sustainability of Military healthcare systems as well as the health of its individuals. Therefore, current healthcare systems must adapt.</p> <p>Over the past four decades, there has been a grassroots utilization of Complementary and Alternative Medicine (CAM), including within Militaries. However, there is little oversight or guidance with the utilization and implementation of CAM worldwide. Thus, collaborative efforts in clinical practices, education and research would have significant impact in reducing duplicity of efforts, expanding the knowledge base as well as broadening the historical and cultural perspectives of healthcare systems.</p> <p>The objective of HFM-195 is to identify and evaluate the various countries' data on military utilization of CAM, understand the acceptability of CAM by Military leadership and briefly review the current regulatory and legal status of CAM utilization and implementation. This Task Force is an exploratory committee in the first step for other possible TF, conferences, and symposia focused on NATO-wide implementation of CAM modalities with on-going analysis of efficacy, cost-effectiveness, suitability, and acceptability. This could ultimately improve healthcare systems and increase available treatment options for patients.</p>																				





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